



DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R3–ES–2015–0145; **4500030113**]

RIN 1018–BA98

Endangered and Threatened Wildlife and Plants; Threatened Species Status for the Eastern Massasauga Rattlesnake

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), determine threatened species status under the Endangered Species Act of 1973 (Act), as amended, for the eastern massasauga rattlesnake (*Sistrurus catenatus*), a rattlesnake species found in 10 States and 1 Canadian Province. The rule adds this species to the Federal List of Endangered and Threatened Wildlife. We have also determined that the designation of critical habitat for the eastern massasauga rattlesnake is not prudent due to an increased risk of collection and persecution.

DATES: This rule is effective **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].**

ADDRESSES: This final rule is available on the Internet at <http://www.regulations.gov> and <http://www.fws.gov/midwest/endangered/reptiles/eama/index.html>. Comments and materials we received, as well as supporting documentation we used in preparing this rule, are available for public inspection at <http://www.regulations.gov> or by appointment,

during normal business hours at: U.S. Fish and Wildlife Service, Chicago Ecological Services Field Office, 230 South Dearborn, Suite 2938, Chicago, IL 60604; telephone 312-216-4720.

FOR FURTHER INFORMATION CONTACT: Louise Clemency, Field Supervisor, U.S. Fish and Wildlife Service, Chicago Ecological Services Field Office, 230 South Dearborn, Suite 2938, Chicago, IL 60604; telephone 312-216-4720. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 800-877-8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, a species may warrant protection through listing if it is endangered or threatened throughout all or a significant portion of its range. Listing a species as an endangered species or threatened species can only be completed by issuing a rule. Additionally, under the Act, critical habitat shall be designated, to the maximum extent prudent and determinable, for any species determined to be an endangered species or threatened species under the Act. We have determined that designating critical habitat is not prudent for the eastern massasauga rattlesnake due to an increased risk of collection and persecution.

This rule makes final the listing of the eastern massasauga rattlesnake (*Sistrurus catenatus*) as a threatened species.

The basis for our action. Under the Act, we can determine that a species is an endangered or threatened species based on any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B)

overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. Although there are several factors that are affecting the eastern massasauga rattlesnake's status, the loss of habitat was historically, and continues to be, the primary threat, either through development or through changes in habitat structure due to vegetative succession.

Peer review and public comment. A Species Status Assessment (SSA) team prepared an SSA report (Szymanski *et al.* 2016) for the eastern massasauga rattlesnake. The SSA team was composed of Service biologists, in consultation with other species experts. The SSA represents a compilation of the best available scientific and commercial data concerning the biological status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the eastern massasauga rattlesnake. We sought comments on the SSA from independent specialists to ensure that our determination is based on scientifically sound data, assumptions, and analyses. We invited these peer reviewers to comment on our listing proposal. We also considered all comments and information we received during the comment period.

The SSA report underwent independent peer review by 21 scientists with expertise in eastern massasauga rattlesnake biology, habitat management, and stressors (factors negatively affecting the species) to the species. The SSA report and other materials relating to this determination can be found on the Midwest Region website at <http://www.fws.gov/midwest/Endangered/> and at <http://www.regulations.gov> under Docket No. FWS-R3-ES-2015-0145.

Previous Federal Actions

On September 30, 2015, the Service published a proposed rule (80 FR 58688) to list the eastern massasauga rattlesnake as a threatened species under the Act (16 U.S.C. 1531 et seq.). We accepted public comments on the proposed rule for 60 days, ending November 30, 2015. Please refer to the proposed rule (80 FR 58688; September 30, 2015) for a detailed description of previous Federal actions concerning this species.

Background

Please refer to the proposed listing rule (80 FR 58688; September 30, 2015) for a summary of species information.

Summary of Biological Status and Threats

The Act directs us to determine whether any species is an endangered species or a threatened species because of any factors affecting its continued existence. We completed a comprehensive assessment of the biological status of the eastern massasauga rattlesnake, and prepared the SSA report, which provides a thorough description of the species' overall viability. We generally defined viability as the ability of the species to maintain self-sustaining populations over the long term. We used the conservation biology principles of resiliency, representation, and redundancy in our analysis. Briefly, resiliency is the ability of the species to withstand environmental stochasticity (unpredictable fluctuations in environmental conditions (for example, wet or dry, warm or cold years)); redundancy is the ability of the species to withstand catastrophic events (for example, droughts, hurricanes); and representation is the ability of the species to adapt over time to long-term changes in the environment (for example, climate changes). In general, the more redundant, representative, and resilient a species is, the more likely it

is to sustain populations over time, even under changing environmental conditions.

Using these principles, we considered the eastern massasauga rattlesnake's needs at the individual, population, and species scales. We also identified the beneficial factors and stressors influencing the species' viability. We considered the degree to which the species' ecological needs are met both currently and as can be reliably forecasted into the future, and we assessed the consequences of any unmet needs as they relate to species viability. In this section, we summarize the conclusions of the SSA, which can be accessed in the SSA report at <http://www.fws.gov/midwest/Endangered/> and at <http://www.regulations.gov> under Docket No. FWS-R3-ES-2015-0145.

For survival and reproduction at the individual level, the eastern massasauga rattlesnake requires appropriate habitat, which varies depending on the season and its life stage (see **Background** section of the proposed listing rule at 80 FR 58688, September 30, 2015). During the winter (generally October through March), they occupy hibernacula, such as crayfish burrows. Hydrology at eastern massasauga rattlesnake sites is important in maintaining conditions with high enough water levels to support the survival of hibernating eastern massasauga rattlesnakes. During their active season (after they emerge from hibernacula), they require sparse canopy cover and sunny areas (intermixed with shaded areas) for thermoregulation (basking and retreat sites), abundant prey (foraging sites), and the ability to escape predators (retreat sites). Habitat structure, including early successional stage and low canopy cover, appears to be more important for eastern massasauga rattlesnake habitat than plant community composition or soil type. Maintaining such habitat structure may require periodic management of most habitat types occupied by the eastern massasauga rattlesnake.

At the population level, the eastern massasauga rattlesnake requires sufficient population size, population growth, survivorship (the number of individuals that survive over time), recruitment (adding individuals to the population through birth or immigration), and population structure (the number and age classes of both sexes) to be sustainable over the long term. Populations also require a sufficient quantity of high-quality microhabitats with intact hydrological and ecological processes that maintain suitable habitat, and connectivity among these microhabitats. In the SSA report, a self-sustaining population of eastern massasauga rattlesnakes is defined as one that is demographically, genetically, and physiologically robust (a population with 50 or more adult females and a stable or increasing growth rate), with a high level of persistence (a probability of persistence greater than 0.9) given its habitat conditions and the risk or beneficial factors operating on it.

We relied on a population-specific model developed by Faust *et al.* (2011, entire) (hereafter referred to as the Faust model) to assess the health of populations across the eastern massasauga rattlesnake's range. Faust and colleagues developed a generic, baseline model for a hypothetical, healthy (growing) eastern massasauga rattlesnake population. Using this baseline model and site-specific information, including population size estimate, stressors operating at the site, and potential future management changes that might address those stressors, the Faust model forecasted the future condition of 57 eastern massasauga rattlesnake populations over three different time spans (10, 25, and 50 years) (for more details on the Faust model, see pp. 4–6 in the SSA report). We extrapolated the Faust model results and supplemental information gathered since 2011 to

forecast the future conditions of the other (non-modeled; n=290) eastern massasauga rattlesnake populations.

At the species level, the eastern massasauga rattlesnake requires multiple (redundant), self-sustaining (resilient) populations distributed across areas of genetic and ecological diversity (representative) to be sustainable over the long term. Using the literature on distribution of genetic diversity across the range of this species, we identified three geographic “analysis units” corresponding to “clumped” genetic variation patterns across the eastern massasauga rattlesnake populations (see Figure 1, below). A reasonable conclusion from the composite of genetic studies that exist (Gibbs *et al.* 1997, entire; Andre 2003, entire; Chiucchi and Gibbs 2010, entire; Ray *et al.* 2013, entire) is that there are broad-scale genetic differences across the range of the eastern massasauga rattlesnake, and within these broad units, there is genetic diversity among populations comprising the broad units. Thus, we interpret these genetic variation patterns to represent areas of unique adaptive diversity. We subsequently use these analysis units (western, central, and eastern) to structure our analysis of viability with regards to representation.

Species' Current Condition

The documented historical range of the eastern massasauga rattlesnake included sections of western New York, western Pennsylvania, southeastern Ontario, the upper and lower peninsulas of Michigan, the northern two-thirds of Ohio and Indiana, the northern three-quarters of Illinois, the southern half of Wisconsin, extreme southeast Minnesota, east-central Missouri, and the eastern third of Iowa. The limits of the current range of the species resemble the boundaries of its historical range; however, the

geographic distribution of extant localities has been restricted by the loss of populations from much of the area within the boundaries of that range. As a result of the stressors acting on eastern massasauga rattlesnake populations, the resiliency of the eastern massasauga rattlesnake across its range and within each of the three analysis units has declined from its historically known condition. Rangewide, there are 558 known historical eastern massasauga rattlesnake populations, of which 263 are known to still be extant, 211 are likely extirpated or known extirpated, and 84 are of unknown status. For the purposes of our assessment, we considered all populations with extant or unknown statuses to be currently extant (referred to as presumed extant, $n=347$). Of those 347 populations presumed extant, 40 percent ($n=139$) are likely quasi-extirpated (have 25 or fewer adult females, which was considered by the Faust model to be too small to be viable (see the SSA report, pp. 46–47, for details)).

The rangewide number of presumed extant populations has declined from the number that was known historically by 38 percent (and 24 percent of the presumed extant populations have unknown statuses). Of those populations presumed extant, 139 (40 percent) are presumed to be quasi-extirpated while 105 (30 percent) are presumed to be demographically, genetically, and physiologically robust (see Table 1, below). Of these presumed demographically, genetically, and physiologically robust populations, 19 (0.5 percent of the presumed extant populations) are presumed to have conditions (stressors affecting the species at those populations are nonexistent or of low impact) suitable for maintaining populations over time and, thus, are self-sustaining. The greatest declines in resiliency occurred in the western analysis unit, where only 20 populations are presumed extant, and, of these, only 1 population is presumed to be self-sustaining. Loss of

resiliency has also occurred, although to a lesser degree, in the central and eastern analysis units, where only 23 and 6 populations, respectively, are presumed to be self-sustaining.

Table 1. The number of populations by status rangewide. (DGP = demographically, genetically, and physiologically)

Status	Number of Populations Rangewide	Percentage of Presumed Extant Populations
Presumed Extant	347	
Quasi-extirpated	139	40
DGP robust	105	30
Self-sustaining	19	0.5

The degree of representation, as measured by spatial extent of occurrence (a measurement of the spatial spread of the areas currently occupied by a species), across the range of the eastern massasauga rattlesnake has declined, as illustrated by the higher proportion of populations lost in the southern and western part of the range and by the loss of area occupied within the analysis units (see Figure 1, below; see also pp. 52–55 in the SSA report). Overall, there has been more than a 41 percent reduction of extent of occurrence (as measured by a reduction in area) rangewide (see Table 2, below). This loss has not been uniform, with the western analysis unit encompassing most of this decline (70 percent reduction in extent of occurrence in the western analysis unit). However, losses of 33 percent and 26 percent of the extent of occurrence in the central analysis unit and eastern analysis unit, respectively, are notable as well. The results are not a true measure of area occupied by the species, but rather a coarse evaluation to make relative comparison among years. The reasons for this are twofold: (1) The calculations are done at the county, rather than the population, level; and (2) if at

least one population was projected to be extant, the entire county was included in the analysis, even if other populations in the county were projected to be extirpated.

Assuming that the loss of extent of occurrence equates to loss of adaptive diversity, the degree of representation of the eastern massasauga rattlesnake has declined since historical conditions.

Figure 1. The three genetically distinct “analysis units” (western, central, and eastern) (adapted from Ray *et al.* 2013, entire) within the historical range of the eastern massasauga rattlesnake and the geographical distribution of presumed extant (extant and unknown status) and extirpated populations within each analysis unit.

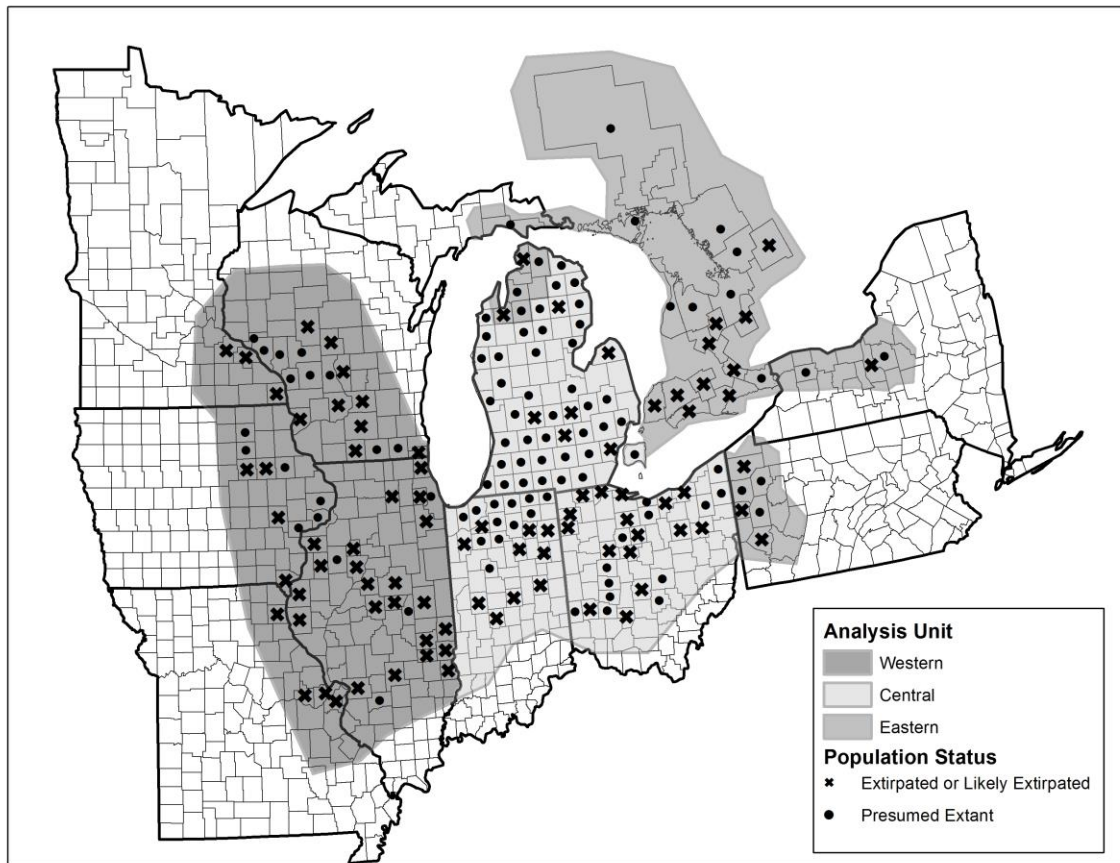


Table 2. The percent reduction in extent of occurrence from historical to present day.

Analysis Unit	Percent Reduction
Western	70
Central	33
Eastern	26
Rangewide	41

The redundancy of the eastern massasauga rattlesnake has also declined since historical conditions. We evaluated the effects of potential catastrophic drought events on the eastern massasauga rattlesnake. Extreme fluctuations in the water table may negatively affect body condition for the following active season, cause early emergence, or cause direct mortality (Harvey and Weatherhead 2006, p. 71; Smith 2009, pp. vii, 33, 38–39). Changes in water levels under certain circumstances can cause mortality to individuals, particularly during hibernation (Johnson *et al.* 2000, p. 26; Kingsbury 2002, p. 38), when the snakes are underwater. The water in the hibernacula protects the eastern massasauga rattlesnake from dehydration and freezing, and, therefore, dropping water levels in the winter leaves the snakes vulnerable to both (Kingsbury 2002, p. 38; Moore and Gillingham 2006, p. 750; Smith 2009, p. 5). Because individual eastern massasauga rattlesnakes often return to the same hibernacula year after year, dropping water levels in hibernacula could potentially decimate an entire population if the majority of individuals in that population hibernate in the same area.

We assessed the vulnerability of unit-wide extirpation due to varying drought intensities, as summarized below (for a detailed description of the analysis, see the SSA report, pp. 55–60, 81–82). The Drought Monitor (a weekly map of drought conditions that is produced jointly by the National Oceanic and Atmospheric Administration, the

U.S. Department of Agriculture, and the National Drought Mitigation Center (NDMC) at the University of Nebraska-Lincoln) classifies general drought areas by intensity, with D1 being the least intense drought and D4 being the most intense drought. For the eastern massasauga rattlesnake, the risk of unit-wide extirpation due to a catastrophic drought varies by analysis unit and by the level of drought considered. Experts believe drought intensities of magnitude D2 or higher are likely to make the species more vulnerable to overwinter mortality and cause catastrophic impacts to eastern massasauga rattlesnake populations. In the central and eastern analysis units, the annual frequency rate for a D3 or D4 drought is zero, so there is little to no risk of unit-wide extirpation regardless of how broadly dispersed the species is within the unit. In the eastern analysis unit, the annual frequency rate for a D2 drought is also zero. Portions of the central analysis unit are at risk of a D2-level catastrophic drought; populations in the southern portion of the central analysis unit and scattered portions in the north are at risk from such a drought. In the western analysis unit, the risk of unit-wide extirpation based on the frequency of a D3 drought is low, but the risk of losing clusters of populations within the western analysis unit is notable; 5 of the 8 population clusters are vulnerable to a catastrophic drought. The probability of unit-wide extirpation in the western analysis unit is notably higher with D2 frequency rates; 7 of the 8 clusters of populations are at risk of D2-level catastrophic drought. Thus, the probability of losing most populations within the western analysis unit due to a catastrophic drought is high (0.82 probability of unit-wide extirpation).

Assessment of Threats and Conservation Measures

The most prominent stressors affecting the eastern massasauga rattlesnake include habitat loss and fragmentation, especially through development and vegetative succession; road mortality; hydrologic alteration (hydrologic drawdown) resulting in drought or artificial flooding; persecution; collection; and mortality of individuals as a result of habitat management that includes post-emergent (after hibernation) prescribed fire and mowing for habitat management. Habitat loss includes direct habitat destruction of native land types (for example, grassland, swamp, fen, bog, wet prairie, sedge meadow, marshland, peatland, floodplain forest, coniferous forest) due to conversion to agricultural land, development, and infrastructure associated with development (roads, bridges). Because eastern massasauga rattlesnake habitat varies seasonally and also varies over its range, the destruction of parts of a population's habitat (for example, hibernacula or gestational sites) may cause a negative effect to individual snakes, thus reducing the numbers of individuals in a population and, in turn, reducing the viability of that population. Habitat is also lost due to invasion of nonnative plant species, dam construction, fire suppression, manipulation of ground water levels, and other incompatible habitat modifications (Jellen 2005, p. 33). These habitat losses continue even in publicly held areas protected from development.

Vegetative succession is a major contributor to habitat loss of the eastern massasauga rattlesnake (Johnson and Breisch 1993, pp. 50–53; Reinert and Buskar 1992, pp. 56–58). The open vegetative structure, typical of eastern massasauga rattlesnake habitat, provides the desirable thermoregulatory areas, increases prey densities by enhancing the growth of sedges and grasses, and provides retreat sites. Degradation of eastern massasauga rattlesnake habitat typically happens through woody vegetation

encroachment or the introduction of nonnative plant species. These events alter the structure of the habitat and make it unsuitable for the eastern massasauga rattlesnake by reducing and eventually eliminating thermoregulatory and retreat areas. Fire suppression has promoted vegetative succession and led to the widespread loss of open canopy habitats through succession (Kingsbury 2002, p. 37). Alteration in habitat structure and quality can also affect eastern massasauga rattlesnakes by reducing the forage for the species' prey base (Kingsbury 2002, p. 37).

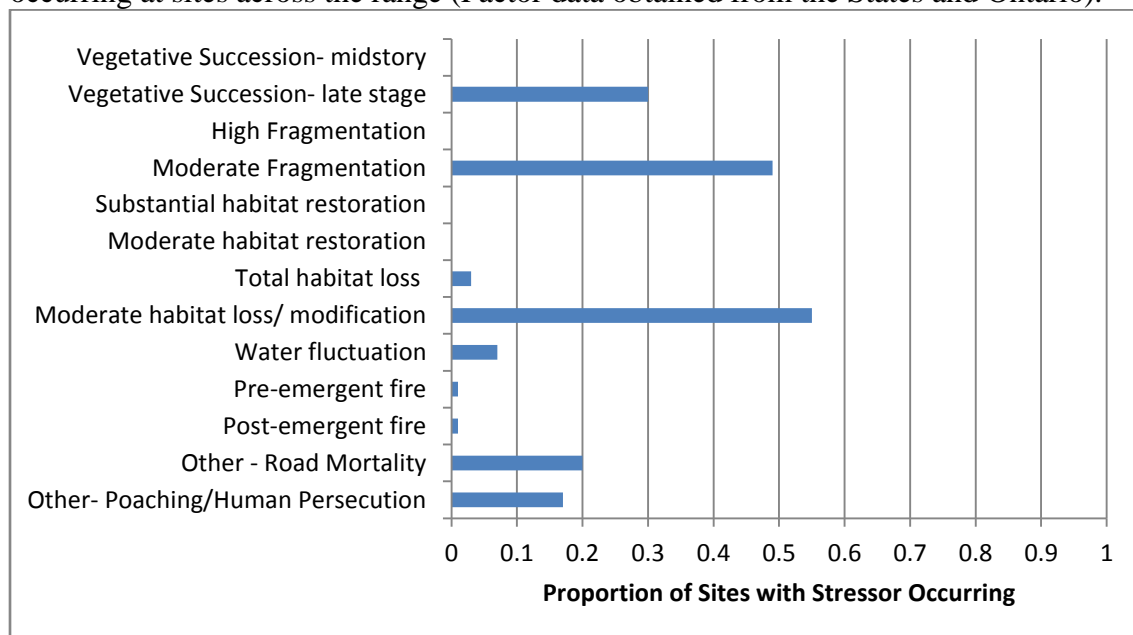
Roads, bridges, and other structures constructed in eastern massasauga rattlesnake habitat fragment the snakes' habitat and impact the species both through direct mortality as snakes are killed trying to cross these structures (Shepard *et al.* 2008b, p. 6), as well as indirectly through the loss of access to habitat components necessary for the survival of the snakes.

Because of the fear and negative perception of snakes, many people have a low interest in snakes or their conservation and consequently large numbers of snakes are deliberately killed (Whitaker and Shine 2000, p. 121; Alves *et al.* 2014, p. 2). Human-snake encounters frequently result in the death of the snake (Whitaker and Shine 2000, pp. 125–126). Given the species' site fidelity and ease of capture once located, the eastern massasauga rattlesnake is particularly susceptible to collection. Poaching and unauthorized collection of the eastern massasauga rattlesnake for the pet trade is a factor contributing to declines in this species (for example, Jellen 2005, p. 11; Baily *et al.* 2011, p. 171).

Assessing the occurrence of the above-mentioned stressors, we found that 94 percent of the presumed extant eastern massasauga rattlesnake populations have at least

one stressor (with some degree of impact on the species) currently affecting the site. Habitat loss or modification is the most commonly occurring stressor (see Figure 2, below). Some form of habitat loss or modification is occurring at 55 percent of the sites; 3 percent of these sites are at risk of total habitat loss (all habitat at the site being destroyed or becoming unusable by the species). Fragmentation is the second most common factor (49 percent of sites), and unmanaged vegetative succession is the third most common factor (31 percent of sites), and unmanaged vegetative succession is the third most common factor (31 percent of sites). Among the other stressors, road mortality occurs at 20 percent, collection or persecution at 17 percent, water fluctuation at 7 percent, and pre- or post-emergent fire at less than 1 percent of the sites.

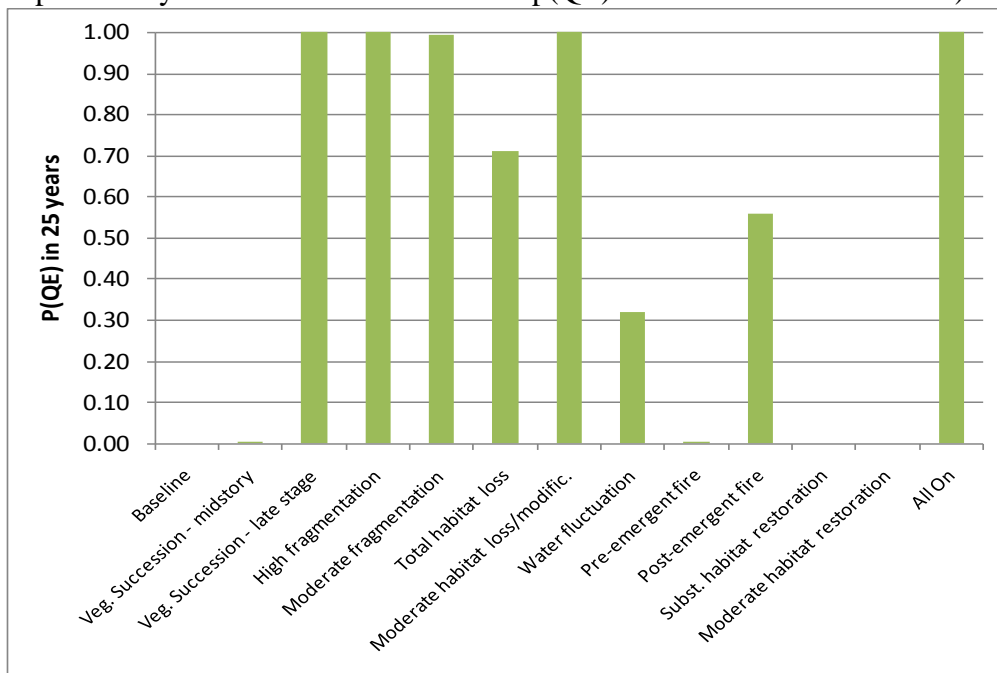
Figure 2. Proportion of eastern massasauga rattlesnake populations with stressor occurring at sites across the range (Factor data obtained from the States and Ontario).



We also considered the magnitude of impact of the various stressors (see Figure 3, below). The Faust model indicates that the stressors most likely to push a population to quasi-extirpation within 25 years (high magnitude stressors) are late-stage vegetative

succession, high habitat fragmentation, moderate habitat fragmentation, total habitat loss, and moderate habitat loss or modification. Our analysis shows that 84 percent of eastern massasauga rattlesnake populations are impacted by at least one high magnitude stressor, and 63 percent are affected by multiple high magnitude stressors. These stressors are chronic and are expected to continue with a similar magnitude of impact into the future, unless ameliorated by increased implementation of conservation actions. Furthermore, these multiple factors are not acting independently, but are acting together, which can result in cumulative effects that lower the overall viability of the species. For a description of the methods used in this threats assessment, refer to pages 39–43 of the SSA report.

Figure 3: Probability of quasi-extirpation ($p(QE)$) in 25 years for a population experiencing each individual stressor and all modeled stressors combined (All On) (taken from Faust *et al.* 2011, p. 15). The probability of quasi-extirpation is a function of the magnitude of impact and the frequency (likelihood) of the stressor occurring (which explains why total habitat loss has lower $p(QE)$ than moderate habitat loss).



In addition to the above stressors, other factors may be affecting individuals. Disease (whether new or currently existing at low levels but increasing in prevalence) is another emerging and potentially catastrophic stressor to eastern massasauga rattlesnake populations. In the eastern and Midwestern United States, the eastern massasauga rattlesnake is specifically vulnerable to disease due to *Ophidiomyces* fungal infections (snake fungal disease (SFD)). The emergence of SFD has been recently documented in the eastern massasauga rattlesnake (Allender *et al.* 2011, pp. 2383–2384) and many other reptiles (Cheatwood *et al.* 2003, pp. 333–334; Clark *et al.* 2011, p. 890; Paré *et al.* 2003, pp. 12-13; Rajeev *et al.* 2009, pp. 1265–1267; Sigler *et al.* 2013, pp. 3343–3344; Sleeman 2013, p. 1), and is concerning because of its broad geographic and taxonomic distributions. However, we did not have sufficient information on the emergence and future spread of SFD or other diseases to reliably model this stressor for forecasting future conditions for the rattlesnake. Our quantitative modeling analysis also does not consider two other prominent stressors, road mortality and persecution and collection, due to a lack of specific information on the magnitude of impacts from these factors. Additionally, this species is vulnerable to the effects of climate change through increasing intensity of winter droughts and increasing risk of summer floods, particularly in the southwestern part of its range (Pomara *et al.*, undated; Pomara *et al.* 2014, pp. 95–97). Thus, while we acknowledge and considered that disease, road mortality, persecution and collection, and climate changes are factors that affect the species, and which may increase or exacerbate existing threats in the future, our viability assessment does not include a quantitative analysis of these stressors.

The eastern massasauga rattlesnake is State-listed as endangered in Iowa, Illinois, Indiana, New York, Ohio, Pennsylvania, and Wisconsin, and is listed as endangered in Ontario. In Michigan, the species is listed as “special concern,” and a Director of Natural Resources Order (No. DFI-166.98) prohibits take except by permit.

Of the 263 sites with extant eastern massasauga populations rangewide, 62 percent (164) occur on land (public and private) that is considered protected from development; development at the other 38 percent of sites may result in loss or fragmentation of habitat. Signed candidate conservation agreements with assurances (CCAAs) with the Service exist for one population in Ohio, one population in Wisconsin, and populations on State-owned lands in Michigan. These CCAAs include actions to mediate the stressors acting upon the populations and provide management prescriptions to perpetuate eastern massasauga rattlesnakes on these sites. The Wisconsin Department of Natural Resources (DNR) developed a CCAA for one population in Wisconsin. Through the agreement, existing savanna habitat on State land, especially important to gravid (pregnant) females, will be managed to maintain and expand open canopy habitat, restore additional savanna habitat, and enhance connectivity between habitat areas. In Ohio, a CCAA for a State Nature Preserve population addresses threats from habitat loss from the prevalence of late-stage successional vegetation, the threat of fire both pre- and post- emergence of eastern massasauga rattlesnakes, and limited connectivity through habitat fragmentation.

The State of Michigan developed a CCAA that will provide for management of eastern massasauga rattlesnakes on State-owned lands. This area includes 33 known eastern massasauga occurrences, which represents approximately 34 percent of the

known extant occurrences within the State and 10 percent rangewide. In addition, other eastern massasauga rattlesnake sites on county- or municipally owned land, as well as on privately owned land, could be included in the CCAA through Certificates of Inclusion issued by the Michigan Department of Natural Resources (MI DNR) prior to the effective date of listing (see **DATES**, above). The CCAA includes management strategies with conservation measures designed to benefit the eastern massasauga rattlesnake; these management strategies will be implemented on approximately 136,311 acres (55,263 hectares) of State-owned land. Many of these management actions are ongoing, but we do not have site-specific data on these management actions to include them in our analysis in the SSA. Nonetheless, we determine that the management actions proposed will address some of the threats (for example, habitat loss, vegetative succession) impacting populations on State lands in Michigan.

We did not assess the CCAAs under our Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE policy) (68 FR 15100; March 28, 2003) because the plans cover only a small part of the range of the species, and the conservation measures in the plans will not change the overall biological status of the species.

We have information that at an additional 22 sites (that are not covered by a CCAA), habitat restoration or management, or both, is occurring; however, we do not have enough information for these sites to know if habitat management has mediated the current stressors acting upon the populations. The Faust model, however, did include these kinds of activities in the projections of trends, and, thus, our future condition analyses are based on the assumption that ongoing restoration would continue into the future. Lastly, an additional 18 populations have conservation plans in place. Although

these plans are intended to manage for the eastern massasauga rattlesnake, sufficient site-specific information is not available to assess whether these restoration or management activities are currently ameliorating the stressors acting upon the population. Thus, we were unable to include the potential beneficial impacts into our quantitative analyses.

Species' Projected Future Condition

To assess the future resiliency, representation, and redundancy of the eastern massasauga rattlesnake, we used the Faust model results to predict the number of self-sustaining populations likely to persist over the next 10, 25, and 50 years, and extrapolated those proportions to the remaining presumed extant populations to forecast the number of self-sustaining populations likely to persist at the future time scales. We then predicted the change in representation and redundancy. The most pertinent results are summarized below. For the full results for all time periods, refer to pages 61–76 of the SSA report.

The projected future resiliency (the number of self-sustaining populations) varies across the eastern massasauga rattlesnake's range. In the western analysis unit, 83 percent of the modeled populations are projected to have a declining trajectory. Furthermore, 94 percent of the populations have a low probability of persistence (the probability of remaining above the quasi-extirpated threshold of 25 adult females is less than 90 percent) by year 25, and, thus, the number of forecasted populations likely to be extant declines over time. By year 50, 18 of the 20 presumed extant populations are projected to be extirpated (no individuals remain) or quasi-extirpated, with only 1 population projected to be self-sustaining. The resiliency of the western analysis unit is forecasted to decline over time. The situation is similar in the central and eastern analysis

units, but to a lesser degree. In the central analysis unit, 70 percent of the modeled populations are projected to have a declining trajectory and 78 percent a low probability of persistence, and thus, by year 50, 180 of the 256 presumed extant populations are projected to be extirpated or quasi-extirpated, and 47 populations to be self-sustaining. In the eastern analysis unit, 83 percent of the modeled populations are projected to have a declining trajectory and 92 percent of the populations are projected to have a low probability of persistence, and, thus, by year 50, 65 of the 71 presumed extant populations are projected to be extirpated or quasi-extirpated, and 6 to be self-sustaining. Rangewide, 54 (16 percent) of the 347 populations that are currently presumed to be extant are projected to be self-sustaining by year 50.

We calculated the future extent of occurrence (representation) for the 57 modeled populations (Faust model) and for the populations forecasted to persist at years 10, 25, and 50 by using the counties occupied by populations to evaluate the proportions of the range falling within each analysis unit and the change in spatial distribution within each analysis unit. Our results indicate that eastern massasauga rattlesnake populations are likely to persist in all three analysis units; however, the distribution of the range is predicted to contract northeasterly, and the geographic area occupied will decline within each analysis unit over time. The results project an 80 percent reduction of the area occupied by the eastern massasauga rattlesnake rangewide by year 50, with the western analysis unit comprising most of the decline (91 percent reduction within the unit). These projected declines in extent of occurrence across the species' range and within the analysis units suggest that loss of adaptive diversity is likely to occur.

We assessed the ability of eastern massasauga rattlesnake populations to withstand catastrophic events (redundancy) by predicting the number of self-sustaining populations in each analysis unit and the spatial dispersion of those populations relative to future drought risk.

The projected future redundancy (the number and spatial dispersion of self-sustaining populations) across the eastern massasauga rattlesnake's range varies. In the western analysis unit, the risk of analysis-unit-wide extirpations from either a D2 or D3 catastrophic drought is high, given the low number of populations forecasted to be extant. Coupling this with a likely concurrent decline in population clusters (reduced spatial dispersion), the risk of analysis-unit-wide extirpation is likely even higher. Thus, the level of redundancy in the western analysis unit is projected to decline into the future.

Conversely, in the eastern analysis unit, there is little to no risk of a D2- or D3-level drought, and consequently the probability of unit-wide extirpation due to a catastrophic drought is very low. Thus, redundancy, from a catastrophic drought perspective, is not expected to decline over time in the eastern analysis unit.

Similarly, in the central analysis unit, there is little to no risk of a D3 catastrophic drought. The southern and northern portions of the central analysis unit, however, are at risk of a D2-level catastrophic drought. Losses of populations in these areas may lead to portions of the central analysis unit being extirpated and will also increase the probability of analysis-unit-wide extirpation. However, the risk of analysis-unit-wide extirpation will likely remain low given the presumed persistence of multiple populations scattered throughout low drought risk areas. Thus, from a drought perspective, the level of redundancy is not likely to be noticeably reduced in the central analysis unit (see Figure

4.3 (p. 60) in the SSA report for a detailed map). A caveat to this conclusion, however, is that the forecasted decline in extent of occurrence suggests our data are too coarse to tease out whether the forecasted decline in populations will lead to substantial losses in spatial distribution, and, thus, the risk of analysis-unit-wide extirpation might be higher than predicted. Therefore, the future trend in the level of redundancy in the central analysis unit is less clear than for either the western analysis unit or the eastern analysis unit.

Given the loss of populations to date, portions of the eastern massasauga rattlesnake's range are in imminent risk of extirpation in the near term. Specifically, our analysis suggests there is a high risk of extirpation of the western analysis unit and of southern portions of the central and eastern analysis units within 10 to 25 years. Although self-sustaining populations are expected to persist, loss of other populations within the central and eastern analysis units are expected to continue as well, and, thus, those populations are at risk of extirpation in the future. These losses have led to reductions in resiliency and redundancy across the range and may lead to irreplaceable loss of adaptive diversity across the range of the eastern massasauga rattlesnake, thereby leaving the eastern massasauga rattlesnake less able to adapt to a changing environment into the future. Thus, the viability of the eastern massasauga rattlesnake has declined and is projected to continue to decline over the next 50 years.

The reader is directed to the SSA report for a more detailed discussion of our evaluation of the biological status of the eastern massasauga rattlesnake and the influences that may affect its continued existence. Our conclusions are based upon the best available scientific and commercial data.

Summary of Changes from the Proposed Rule

In preparing this final rule, we reviewed and fully considered comments from the public and peer reviewers on the proposed rule. This final rule incorporates minor changes to our proposed listing based on the comments we received, as discussed below in **Summary of Comments and Recommendations**, and newly available scientific data. The SSA report was updated based on additional data provided, primarily by State fish and wildlife agencies. These data allowed us to refine site-specific information and improve our understanding of status for several populations. Thus, the final numerical results in the second version of the SSA report are slightly different from those in the first version that was used for the proposed rule. None of the new information we received changed our determination in this final rule that the eastern massasauga rattlesnake is a threatened species.

Summary of Comments and Recommendations

In the proposed rule published on September 30, 2015 (80 FR 58688), we requested that all interested parties submit written comments on the proposal by November 30, 2015. We also contacted appropriate Federal and State agencies, scientific experts and organizations, and other interested parties and invited them to comment on the proposal. Newspaper notices inviting general public comment were published in USA Today. We did not receive any requests for a public hearing. All substantive information provided during the comment period has either been incorporated directly into this final determination or is addressed below.

Peer Reviewer Comments

In accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited review of the SSA report from 32 knowledgeable individuals with scientific expertise that included familiarity with eastern massasauga rattlesnake and its habitat, biological needs, and threats. We received responses from 21 of the peer reviewers.

We reviewed all comments we received from the peer reviewers for substantive issues and new information regarding the eastern massasauga rattlesnake. Peer reviewer comments are addressed in an appendix to the SSA report, and in the SSA itself, as appropriate.

Federal Agency Comments

(1) Comment: The U.S. Forest Service (Huron-Manistee National Forest) stated that there is a need to differentiate between upland and lowland habitat in regard to seasonal restrictions on prescribed burning within management units of the Huron-Manistee National Forest where eastern massasauga rattlesnakes occur. The Forest Service cited a conservation plan (Kingsbury 2002) that stated that upon emerging from hibernation, most eastern massasauga rattlesnakes are lethargic and constrained by cool temperatures, and so remain in the vicinity of their wetland burrows through mid-May. They also recommended that the Service provide a framework for allowing prescribed fire in upland habitats until May 15 in ways that do not violate section 9 of the Act.

Our Response: We agree that the best available information suggests that, upon emerging from hibernation, most eastern massasauga rattlesnakes do remain lethargic, and stay in the vicinity of their burrows (usually located in wetlands) for up to several weeks, and during that time they are especially vulnerable to risks from predation,

prescribed fire, or other sources of mortality. Prior to emergence from hibernation, when eastern massasauga rattlesnakes still have some protection in the confines of the burrows in which they hibernate, they are relatively protected from sources of mortality that would take place on the surface. Thus, risk of mortality caused by prescribed fire is greatest when snakes are above ground (Durbian 2006, pp. 329–330; Cross *et al.* 2015, pp. 346–347). Many populations of eastern massasauga rattlesnakes are small, and in such populations, loss of only a few individuals can have significant impacts (Seigel and Sheil 1999, p. 20), and prescribed fire was one of the most prominent stressors we identified in the SSA for the eastern massasauga rattlesnake.

Unfortunately, within the range of this species, unpredictable late winter or spring weather patterns, and resulting ground conditions (such as humidity, snow cover, prevailing winds), provide a number of constraints to land managers who need to implement prescribed fires to maintain habitats. Thus, we are also aware that a challenge to managing occupied eastern massasauga habitat with prescribed fire is determining the best time to apply fire without risking mortality. At most of the known sites within the range of the eastern massasauga rattlesnake that were included in our analysis, populations are small and vulnerable to additive mortality (any mortality beyond that which would be expected from predation or other natural factors), as could occur from poorly timed prescribed fire. While land managers often request “cutoff” dates before which burns can be assumed to be safe, natural variation in weather cycles can affect the dates when snakes emerge from hibernation, with fluctuations of 1 to 3 weeks not being uncommon. In addition to the conservation plan (Kingsbury 2002, entire) provided by the Forest Service, and that was also reviewed in our SSA, we discussed emergence

biology of eastern massasauga rattlesnakes at the latitude of the Huron-Manistee National Forest with Dr. Bruce Kingsbury (2016, pers. comm.). Kingsbury shared additional observations of emerging eastern massasauga rattlesnakes in northern Michigan since his 2002 conservation plan; he added that his observations since 2002 now indicate that many eastern massasauga rattlesnakes that emerge from hibernation in central and northern Michigan in April begin to disperse into adjacent habitats as early as May 1. Because of this, Kingsbury cautioned against reliance on a firm calendar date as a rule by which to plan prescribed fires if unintentional mortality is to be avoided. Instead, he urged land managers to use predictive models to help forecast when eastern massasauga rattlesnakes are most likely to emerge from hibernacula in a given region and year. We thus cannot provide the framework requested by the Forest Service to conclude that use of prescribed fire before May 15 will never result in “take” of the eastern massasauga rattlesnake.

Because the issue of using prescribed fire as a tool for maintaining suitable habitat for eastern massasauga rattlesnakes is so important, but also understandably controversial (due to the potential for additive mortality), the Service funded a study (from 2010 through 2015) of rangewide phenology (relation between climate and periodic biological phenomena) of the species to better understand the factors influencing ingress and egress from hibernation. Preliminary results of that study indicate that emergence of eastern massasauga rattlesnakes from hibernation at sites throughout the range is predictable based on rising subsurface soil temperatures (King 2016, pers. comm.). In addition, regional weather stations maintained by the National Oceanic and Atmospheric Administration (NOAA) monitor soil temperatures at the strata crucial for predicting

emergence. Near real-time data generated at these weather stations also are accessible to the public, and when stations are located near extant populations of the eastern massasauga rattlesnake, these could be used by land managers to determine whether emergence from hibernation is near, and thus whether burns should be avoided for the remainder of the active season. As further analyses are completed and the results of the study are made available, we will work cooperatively with interested land managers to incorporate the results into useful burn plans. Federal land management agencies, such as the Forest Service, that use prescribed fire to manage habitats occupied by the eastern massasauga rattlesnake should consult with the Service as provided by section 7(a)(2) of the Act. In addition, private and State land managers can work with the Service to develop plans and determine if permits are appropriate to conduct recovery efforts.

Comments from States

(2) *Comment:* A State fish and wildlife management agency (Pennsylvania Boat and Fish Commission (PBFC)), a State advisory group (Pennsylvania Biological Survey), and a private individual stated that the eastern massasauga rattlesnake has experienced a large range reduction in Pennsylvania, and current surveys confirm that extant populations remain at only three sites in the State. They further commented that the remaining populations are isolated from one another and subject to continued threats of habitat alteration, persecution, and illegal collecting.

Our Response: We thank the commenters for the detailed information. These data corroborate our analysis. We considered the continued decline of the eastern massasauga rattlesnake in Pennsylvania, as well as other States in the range of the eastern

massasauga rattlesnake, in the SSA, and agree that the best available information indicates that this species is declining in Pennsylvania. Based on the status information throughout the species' range and continuing threats to the species, we determined that the eastern massasauga rattlesnake is likely to become in danger of extinction throughout its range within the foreseeable future, and thus are listing it as a threatened species.

(3) Comment: A State fish and wildlife management agency (PBFC), a State advisory group (Pennsylvania Biological Survey), and several private individuals commented that listing would benefit the eastern massasauga rattlesnake by encouraging recovery planning, surveys, outreach and education to the public, and other rangewide conservation efforts.

Our Response: After listing the species, the Service will continue to work closely with State conservation agencies, nongovernmental organizations (NGOs), and other willing partners throughout the range of the species to determine practical and comprehensive actions and outreach to conserve and recover the eastern massasauga rattlesnake.

(4) Comment: Two State fish and wildlife management agencies (PBFC and Wisconsin Department of Natural Resources (WI DNR)) commented that the Service incorporated data and comments provided by herpetologists from the commenter's staff on the SSA, and that the SSA represents the best available information on the eastern massasauga rattlesnake in their State.

Our Response: We thank the staffs of PBFC and WI DNR, as well as other State and county conservation agencies and NGOs, for assisting us in compiling the best available information on the current distribution and status of the eastern massasauga rattlesnake throughout its range and for providing review of the SSA report.

(5) *Comment:* A State fish and wildlife management agency (PBFC) and the Western Pennsylvania Conservancy (an NGO) commented that an Eastern Massasauga Species Action Plan for Pennsylvania was compiled in 2011, to prioritize and guide research and conservation actions at the State's extant and presumed extant sites, and noted recent conservation and management actions under that plan. A copy of the plan was provided.

Our Response: We thank the commenters for providing a copy of the plan, and we incorporated actions outlined in the plan into our revised SSA report. When the species is listed (see **DATES**, above), conservation and recovery planning will involve multiple stakeholders. In addition, relatively new tools (such as spatially explicit habitat models or collaborative processes such as Landscape Conservation Design) are available to plan recovery actions at landscape scales, and to involve multiple stakeholders in the planning process. After listing takes effect (see **DATES**, above), the Service will continue to work closely with State conservation agencies, NGOs, and other willing partners to determine practical and comprehensive conservation actions for the eastern massasauga rattlesnake.

(6) *Comment:* A State fish and wildlife management agency (PBFC) stated that the loss of resiliency and redundancy across the species' range within Pennsylvania leaves the eastern massasauga rattlesnake vulnerable and with little adaptability to future changes in its environment. In addition, this commenter stated that, given the small part of the eastern massasauga rattlesnake's range that is represented in Pennsylvania, the conservation actions undertaken within the State at these vulnerable, isolated sites are projected to have little impact on the overall persistence of the species without a more comprehensive, regional approach.

Our Response: We agree that loss of redundancy and loss of resiliency across the range of the eastern massasauga rattlesnake are of concern. As stated in the SSA report for the eastern massasauga rattlesnake, we used the genetic haplotypes identified by Ray *et al.* (2013) as geographic analysis units. We found variation in resiliency and redundancy within and between the three analysis units (western analysis unit, central analysis unit, and eastern analysis unit). While resiliency was lowest in the western analysis unit, there was notably low resiliency in the central analysis unit and eastern analysis unit, especially along the southern edges, which includes populations in Pennsylvania (in the eastern analysis unit). Following listing (see **DATES**, above), we will continue to work with our partners in State agencies as well as with local agencies, NGOs, and other interested parties to implement conservation measures for this species. We agree that, whenever possible, conservation measures undertaken as part of comprehensive regional plans have more value than actions taken on a site-by-site basis. In addition to recovery planning and other traditional tools, Landscape Conservation

Design (LCD) may be an option to help catalyze such regional planning approaches for the eastern massasauga rattlesnake.

(7) Comment: A State fish and wildlife management agency (PBFC) stated that, because of the species' increasing isolation, habitat loss, and population decline, potential changes to the landscape and site conditions would have a high risk of adversely affecting Pennsylvania's eastern massasauga rattlesnake population.

Our Response: We agree that most of these factors present risks to the eastern massasauga rattlesnake, and these factors were considered in the SSA for the species. One exception was isolation, which was not evaluated as a direct stressor. While genetic isolation may operate as a stressor, our review of the literature for the SSA provides evidence that some high degree of genetic isolation in this species may be natural and pre-date European settlement; thus, isolation in and of itself is not necessarily a stressor to the species.

(8) Comment: Several commenters, including a State fish and wildlife management agency (WI DNR), provided statements supporting our determination that designating critical habitat for the eastern massasauga rattlesnake is not prudent due to the increased risks to the species if site locations are made publicly available.

Our Response: In the **Critical Habitat** section of this final rule, we have determined that the designation of critical habitat would increase the threat to eastern massasauga rattlesnakes from persecution, unauthorized collection, and trade; thus, designating critical habitat for the species is not prudent. Designation of critical habitat

requires the publication of detailed maps and a specific narrative description of critical habitat in the **Federal Register**, and these in turn often become available through other media. We have determined that the publication of maps and descriptions outlining the locations of this species would further facilitate unauthorized collection and trade, as collectors would know the exact locations where eastern massasauga rattlesnakes occur. Due to the threat of unauthorized collection and trade, a number of biologists working for State and local conservation agencies that manage populations of eastern massasauga rattlesnakes also expressed to the Service serious concerns with publishing maps and boundary descriptions of occupied habitat areas that could be associated with critical habitat designation (Redmer 2015, pers. comm.).

(9) Comment: A State fish and wildlife management agency (WI DNR) commented that they will continue to encourage management of known eastern massasauga rattlesnake sites to address succession and other habitat concerns, and will continue to submit data and work collaboratively with the Service on eastern massasauga rattlesnake conservation.

Our Response: We thank WI DNR for their shared interest in conservation actions for the eastern massasauga rattlesnake, and for stating their interest in continuing our partnership for conserving this species following listing.

(10) Comment: WI DNR provided updated data on the status of the eastern massasauga rattlesnakes and their conservation actions at two specific sites.

Our Response: We thank WI DNR for their willingness to coordinate, for providing relevant data while we were preparing the SSA, and for providing additional information in their comments. We have incorporated that additional information into our revised SSA report.

(11) Comment: WI DNR commented that an additional conservation measure for the eastern massasauga rattlesnake in Wisconsin includes a broad incidental take permit/authorization for management work conducted within massasauga habitat (<http://dnr.wi.gov/topic/ERReview/ItGrasslands.html>).

Our Response: When the listing becomes effective (see **DATES**, above), any incidental take of eastern massasauga rattlesnakes will be prohibited under section 9 of the Act unless permitted under section 10(a)(1)(B) or section 7(a)(2) of the Act. We will work with WI DNR to clarify our respective roles and responsibilities with respect to incidental take.

(12) Comment: The Minnesota Department of Natural Resources (MN DNR) confirmed that there are no verified records of eastern massasauga rattlesnakes from within the State in the past 50 years. They stated that because of this lack of recent occurrence, they may request that the Service remove Minnesota from the eastern massasauga rattlesnake's current range.

Our Response: During our evaluation of the species, we consulted with staff from the MN DNR to assess the best available information on the species' occurrence in the State. We thank the commenter for providing additional information specific to surveys

that led to historical populations in Minnesota being considered likely extirpated. We will consider a range of recovery actions following listing, and will work with local and State partners to determine and implement actions that would have the most benefit to the species. We concur that the best available information suggests that this species is likely extirpated from Minnesota, and thus Minnesota is not considered part of the current range. However, the species receives the protections of the Act wherever found; thus, if the species does occur in Minnesota in the future, it would be protected there.

(13) Comment: The MI DNR recommended that, to address public safety concerns, the Service develop a rule under section 4(d) of the Act (a “4(d) rule”) that would allow people to move the snakes from “high risk environments (for example, backyards, state campgrounds, schools) to areas with low risk.” They further commented that such a 4(d) rule would reduce persecution of the snakes.

Our Response: We understand that the MI DNR receives several calls each year reporting an eastern massasauga rattlesnake in or near a human dwelling and requesting assistance to remove it. A 4(d) rule, however, is not necessary to provide for the relocation of snakes from areas where people may be at risk of bodily harm. Such an action, if done on a good faith belief to protect a person from bodily harm, is already provided for under the Act without a 4(d) rule; see 16 U.S.C. 1540(a)(3) and 1540(b)(3). This provision of the Act applies to all listed species.

We also note that non-harmful actions to encourage eastern massasauga rattlesnakes to leave, stay off, or keep out of areas with frequent human use, including a residence, yard, structure, sidewalk, road, trail, foot path, or campground, would not

result in take and thus will not be prohibited. For example, homeowners may use a broom or pole to move an eastern massasauga rattlesnake away from their property. When circumstances create an imminent threat to human safety, all forms of take of listed species (including harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect) are allowed to safeguard human safety. The Act's implementing regulations (50 CFR part 17) include a take exemption pursuant to the defense of human life (for threatened species, see 50 CFR 17.31, which incorporates provisions set forth at 50 CFR 17.21(c)(2)): "any person may take endangered [or threatened] wildlife in defense of his own life or the lives of others.") The regulations at 50 CFR 17.21(c)(4) require that any person taking, including killing, listed wildlife in defense of human life under this exception must notify our headquarters Office of Law Enforcement, at the address provided at 50 CFR 2.1(b), in writing, within 5 days. In addition, section 11 of the Act enumerates the penalties and enforcement of the Act. In regard to civil penalties, section 11(a)(3) of the Act states, "Notwithstanding any other provision of this [Act], no civil penalty shall be imposed if it can be shown by a preponderance of the evidence that the defendant committed an act based on a good faith belief that he was acting to protect himself or herself, a member of his or her family, or any other individual from bodily harm, from any endangered or threatened species" (16 U.S.C. 1540(a)(3)). Section 11(b)(3) of the Act contains similar language in regard to criminal violations (see 16 U.S.C. 1540(b)(3)).

Eastern massasauga rattlesnakes generally hibernate in wetlands, rather than in places occupied by people. However, in areas near wetlands or uplands with natural habitat, eastern massasauga rattlesnakes occasionally find their way into areas of high

human use (for example, human-made structures, backyards, or campgrounds). If an eastern massasauga rattlesnake is encountered, it is best to not disturb it and to walk away from it. However, in areas of high human use, other responses may be necessary to protect people from bodily harm. Eastern massasauga rattlesnakes observed in areas of human use may subsequently conceal themselves as a natural defense mechanism and then later be unexpectedly encountered at close range, presenting the possibility of bodily harm. Short-distance translocation (moving from one location to another) of venomous snakes is a common method used to reduce or mitigate snake-human conflicts. In one recent study, eastern massasauga rattlesnakes relocated 200 meters (656 feet) from the capture point did not exhibit abnormal movement or basking behavior and did not return to the capture site (Harvey *et al.* 2014). Because the eastern massasauga rattlesnake is a venomous species, we advise due caution and encourage anyone wishing to move a snake to contact an appropriate State or local agency for professional expertise in handling rattlesnakes. In addition, the State or local landowner may have other legal requirements that apply to handling wildlife. Therefore, when on public lands, we encourage contacting the land manager to address the situation whenever feasible. However, anyone may take necessary action at any time to protect one's self or another person from bodily harm.

(14) Comment: MI DNR provided a Michigan Natural Features Inventory (MNFI) report with the most current eastern massasauga rattlesnake data for the State.

Our Response: We thank MI DNR and MNFI for compiling and providing this additional information. MNFI is the organization responsible for maintaining the

Michigan Natural Heritage Database, which includes known historical records for species of concern, including the eastern massasauga rattlesnake, in Michigan. The database includes records for populations of extirpated, likely extirpated, unknown, and extant status. During preparation of the SSA report, the Service worked closely with MNFI to ensure that the most current, available information from the Michigan Natural Heritage Database on the status of the eastern massasauga rattlesnake in Michigan was included in our analyses. This included new records that the MNFI provided to us as late as September 2015, after we had developed the proposed listing rule. The report compiled by MNFI was added to our records and used to further document our decision.

(15) Comment: MI DNR noted, as was mentioned in the SSA report, that they are in the final stages of completing a CCAA for the eastern massasauga rattlesnake on MI DNR lands. They requested that the Service consider how Michigan's CCAA will address threats to the eastern massasauga on MI DNR lands in the final listing determination.

Our Response: A CCAA is a formal agreement between the Service and one or more parties to address the conservation needs of proposed or candidate species, or species likely to become candidates, before they become listed as endangered or threatened. Landowners voluntarily commit to conservation actions that will help stabilize or restore the species with the goal that if all other necessary landowners did the same, listing would become unnecessary. These agreements encourage conservation actions for species that are candidates for listing or are likely to become candidates. Although a single property owner's activities may not eliminate the need to list,

conservation, if conducted by enough property owners throughout the species' range, can eliminate the need to list. The agreements provide landowners with assurances that their conservation efforts will not result in future regulatory obligations in excess of those they agree to at the time they enter into the agreement.

After publication of the proposed rule to list the eastern massasauga rattlesnake as a threatened species, the State of Michigan submitted to the Service a CCAA that would provide for management of eastern massasauga rattlesnakes on State-owned lands. The term of the CCAA and permit is 25 years. The CCAA includes management strategies with conservation measures designed to benefit eastern massasauga rattlesnakes; these management strategies will be implemented on approximately 136,311 acres (55,263 hectares) of State-owned land.

Management strategies beneficial to eastern massasauga rattlesnakes are currently being implemented on many sites on State-owned lands in Michigan, and are ongoing. The CCAA describes a program of continuing existing management strategies beneficial to eastern massasauga rattlesnakes and reflects the current conditions analyzed in the SSA. Existing conservation on State-owned lands in Michigan was accounted for in the SSA; the CCAA does not provide detailed site-specific information to alter that analysis. Thus, the CCAA does not alter the SSA results or projected population trends. While the actions in the CCAA are expected to address some of the stressors on many sites on State-owned lands in Michigan, the CCAA only covers a small part of the species' range; therefore, the conservation measures did not affect the overall biological status of the species.

(16) *Comment:* MI DNR questioned the Service's use of three analysis units to assess the species' current conditions in the SSA, and how use of those three units will affect recovery planning and, ultimately, delisting. MI DNR expressed their opinion that recovery planning be based on the species' range and not the three analysis units.

Our Response: We identified and delineated the analysis units to assess the historical, current, and future representation of the species. Representation is an indicator of the ability of the species to respond to physical (for example, habitat, climate) and biological (for example, new diseases, predators, competitors) changes in its environment. The intent of the analysis units is to capture the breadth of adaptive diversity (genotypic (genetic makeup) and phenotypic (physical traits) diversity of the species). We evaluated available genetic and ecological information to identify areas of unique or differing genotypic and phenotypic diversity. We did not find any compelling ecological differences, but did find strong evidence of genetic variation across the range. Data indicate that the eastern massasauga rattlesnake shows high levels of genetic variation (populations can be genetically distinguished from each other) at regional and local scales. The synthesis of this genetic data supports delineating, on the basis of genetic differentiation, the three broad regions identified by Ray *et al.* (2013, entire). Although several studies showed detectable genetic differences among populations within these three broad areas, we did not have sufficient information to delineate smaller-scale units. Thus, we assessed the distribution among and within these three geographic units to evaluate changes in eastern massasauga rattlesnake representation from historical condition to the present and future. These analysis units were identified for purposes of evaluating representation in the SSA, and are not, at this point, intended

to represent recovery units as might be identified during recovery planning. Any future recovery planning effort will use the best available information to promote the conservation and survival of the species.

(17) Comment: The New York Department of Environmental Conservation (NYDEC) commented that the species is listed as State endangered in New York, and that due to the limited range and vulnerability of populations, the State does not anticipate delisting the species at any point in the future.

Our Response: We considered the current status of the eastern massasauga rattlesnake in New York, as well as other States in the range of the eastern massasauga rattlesnake, in the SSA. We agree that the best available information indicates that only two populations of this species occur in New York State, and thus its conservation status is of concern there.

(18) Comment: NYDEC stated that the two populations in the State occur on lands under conservation protection: one is owned by a private conservation organization, and the other is a State Wildlife Management Area. NYDEC further commented that it has been successful at managing for eastern massasauga rattlesnakes at the State-owned site, and believes that under continued management, the species will continue to thrive at that site. Thus, NYDEC encourages the Service to endorse active habitat management practices that promote habitat for the species.

Our Response: The efforts of States and other partners to benefit the eastern massasauga rattlesnake are important, and we agree that habitat management activities to

maintain appropriate vegetative structure for the eastern massasauga rattlesnake are crucial to its continued survival. However, certain management activities (for example, prescribed fire) are also known to be important stressors to the species, especially where population sizes are small or when timing of the management action increases risk (for example, just after snakes emerge from hibernation). We will continue to work closely with our partners in State and local agencies, NGOs, and any other parties interested in conserving this species to investigate best management practices and the tradeoffs between management and potential mortality to the rattlesnakes.

(19) Comment: NYDEC requested that the Service include a 4(d) rule to exempt some habitat management practices, such as woody vegetation removal, when conducted at a time and scale that makes adverse impacts to the eastern massasauga rattlesnake unlikely.

Our Response: We agree that active habitat management for the eastern massasauga rattlesnake will be crucial to long-term maintenance and recovery of existing populations. However, we believe issuance of a 4(d) rule would not be required to allow such management activities for two reasons. First, management actions may take place on a case-by-case basis, and we would like to learn more about how to lessen the risk of eastern massasauga rattlesnake mortality while still allowing appropriate habitat management to occur. Second, vegetation management actions that take place at certain times of the year when the snakes are not active (for example, during winter when snakes are hibernating underground) would not affect the species and, thus, do not require a 4(d) rule. The Act allows flexibility for us to consider a range of recovery actions following

listing, and we will work with local and State partners to determine and implement actions that have the most benefit to the species.

Public Comments

(20) Comment: An NGO (the Western Pennsylvania Conservancy (WPC)) commented that they continue to work closely with PBFC on eastern massasauga rattlesnake conservation efforts, including implementation of the Eastern Massasauga Species Action Plan. In 2009–2010, habitat management plans were developed for eight private landowners in areas where eastern massasauga rattlesnakes are known to occur. WPC has implemented some of the management plans with the help of PBFC, the Pennsylvania Wildlife Commission, and the Pennsylvania Department of Conservation and Natural Resources, including habitat restoration activities funded by small foundation grants over the past 5 years.

Our Response: Following listing (see **DATES**, above), we will continue to work with our partners in State agencies as well as with local agencies, NGOs, and other interested parties to implement conservation measures for this species. Existing efforts to conserve the species or local planning documents, like those mentioned by the commenter, will be valuable in developing regional or rangewide recovery efforts.

(21) Comment: One commenter stated that it is difficult to achieve on-the-ground conservation and restoration for the eastern massasauga rattlesnake and that land protection efforts are slow and opportunities are limited.

Our Response: Limited resources are often a challenge in conservation.

Following listing (see **DATES**, above), we will continue to explore opportunities to partner with State and local conservation agencies, NGOs, and other interested parties to leverage resources and find cooperative solutions to such challenges for the eastern massasauga rattlesnake.

(22) *Comment:* One commenter stated that not all factors that may contribute to the decline of the species were fully explored in the SSA. In particular, the commenter noted that, while the proposed rule acknowledged climate change as a factor exacerbating the threats to this species, it did not provide a quantitative analysis of the impacts nor fully account for such uncertainty.

Our Response: A recently published climate change vulnerability analysis for the eastern massasauga rattlesnake (Pomara *et al.* 2015, entire) suggests that populations in the southwestern parts of the species' range are extremely vulnerable to climate change through increasing intensity of winter drought and increasing risks of summer floods. Populations in the eastern and central parts of the species' range are vulnerable to climate variables, but to a lesser extent than the southwestern populations, and the northeastern populations are least vulnerable to climate change.

We acknowledged in the SSA report that we believe our results underestimate the risks associated with climate change, especially in Indiana and Michigan. As we move forward with recovery for the eastern massasauga rattlesnake, we will more fully investigate the effects of climate change and work towards buffering vulnerable populations.

(23) *Comment:* Several commenters supported listing the eastern massasauga rattlesnake. The comments included statements such as:

- Resource development (natural gas extraction and open pit mining for limestone, coal, and gravel) is a significant threat to the species;
- Significant ongoing decline and multiple continuing threats throughout the species' range support listing;
- Only small, isolated populations of the eastern massasauga rattlesnake remain, and the species should be protected before further losses occur; and
- It is important to preserve biodiversity, so this species should be protected.

Our Response: We thank these commenters for their statements. When Congress passed the Act in 1973, it recognized that our rich natural heritage is of “aesthetic, ecological, educational, recreational, and scientific value to our Nation and its people.” It further expressed concern that many of our nation’s native plants and animals were in danger of becoming extinct. The purpose of the Act is to protect and recover imperiled species and the ecosystems upon which they depend, and thus plays a role in preserving biodiversity.

(24) *Comment:* One commenter stated that, as an alternative to designating critical habitat, species protection could be improved by strengthening environmental review for the eastern massasauga rattlesnake by providing more information and adding more stringent requirements on those conducting permitted activities. This commenter

recommended close coordination between Federal and State agencies to achieve the appropriate level of environmental review and management to conserve the species.

Our Response: Following listing of the eastern massasauga rattlesnake (see **DATES**, above), regulatory provisions of the Act will take effect. For example, the actions of Federal agencies that may affect the species will be subject to consultation with the Service as required under section 7(a)(2) of the Act. In doing so, the Service works with the action agencies to avoid or minimize adverse effects to the species to ensure that the continued existence of the species is not jeopardized. Also following listing, we will work closely with our partners in Federal, State, and local units of government, as well as NGOs and others with an interest in the species, to identify and implement proactive measures to conserve and recover the species.

(25) Comment: Several commenters stated that critical habitat should be designated for the eastern massasauga rattlesnake. One of these commenters added that habitat is “critical to the species’ survival” and habitat loss and degradation is the most significant threat to the species, and provided information arguing that although human persecution is a threat, and human disturbance of the snakes did change the snakes’ behavior, no long-term effects were observed. They further commented that increased risk of illegal collection or persecution could be addressed through education efforts.

Our Response: We agree that outreach efforts will be important in addressing many topics related to conserving the eastern massasauga rattlesnake. However, we determined that designation of critical habitat would increase persecution, unauthorized collection, and trade threats to the eastern massasauga rattlesnake. The eastern

massasauga rattlesnake is highly valued in the pet trade, and that value is likely to increase as the species becomes rarer. In addition, as a venomous species, it also is the target of persecution. Furthermore, States and other land managers have taken measures to control and restrict information on the locations of the eastern massasauga rattlesnake and to no longer make location and survey information readily available to the public. We have, therefore, determined in accordance with 50 CFR 424.12(a)(1) that it is not prudent to designate critical habitat for the eastern massasauga rattlesnake (see **Critical Habitat**, below, for a full discussion).

(26) Comment: One commenter stated that a rattlesnake does not contribute meaningfully to its ecosystem; thus, the Service should focus on more important and less loathsome species.

Our Response: While the eastern massasauga rattlesnake is a venomous species, and we are aware that this is a reason some people may fear it, the species is considered to be among the more shy and docile species of North American rattlesnakes. Eastern massasauga rattlesnakes are known to eat voles, mice, other small mammals, small birds, amphibians, and even other species of snakes. Predatory birds (such as hawks) and mammals (such as raccoons) are also known to prey on eastern massasauga rattlesnakes. Thus, they do have a function within ecosystems where they occur. Finally, there are no provisions in the Act that allow us to distinguish between species that are popular and those that are disliked. We used the best available scientific and commercial data to determine that the eastern massasauga rattlesnake warrants listing as a threatened species.

(27) *Comment:* One commenter stated that public education will be an important component of conservation for the eastern massasauga rattlesnake.

Our Response: We thank the commenter and agree with this statement. We are aware that, under rare circumstances, bites from a venomous snake, such as the eastern massasauga rattlesnake, could present some risk to human health and safety. We are also aware that this is a reason why some people fear the eastern massasauga rattlesnake. Since the species became a candidate for listing in 1999, the Service has worked closely with our partners to provide outreach through producing or funding print and digital outreach materials, providing staff as speakers, and also responding to questions from the media pertaining to this species. Following listing (see **DATES**, above), this need will not change, and it is our intent to continue to work with partners to ensure that current information on the role played by this species is available to the public.

(28) *Comment:* The Illinois Farm Bureau expressed concern that “certain pesticide use” was included in the proposed rule as an activity that may “result in a violation of section 9 of the Act.” They stated that the SSA report does not provide supporting evidence that pesticides are a stressor. They requested that “certain pesticide use” be removed from the list of activities that may result in a violation of section 9.

Our Response: Based on this comment, we took a closer look at the risk to the species associated with pesticide use and have removed “certain pesticide use” from the list of activities that may result in a violation of section 9 of the Act under the **Available Conservation Measures** section of this final rule. We included pesticide use in the original list of potential threats due to the potential for impacts to populations of

burrowing crayfishes upon which the eastern massasauga rattlesnake relies (by hibernating in the burrows of these crayfish); however, this link is not strongly substantiated. If additional supporting information is found that pesticides may pose a threat to the burrowing crayfishes and the eastern massasauga rattlesnake, we may again recognize this in the future. We note that any determination of whether an activity results in prohibited “take” of an eastern massasauga rattlesnake is case-specific and independent of our discussion in the proposed or final listing rules.

(29) Comment: The Illinois Farm Bureau requested that, as an important stakeholder, they should be involved in a “robust stakeholder engagement process” to develop best management practices (BMPs) and avoidance measures that protect the eastern massasauga rattlesnake.

Our Response: Extant populations of the eastern massasauga rattlesnake are now extremely rare in Illinois (perhaps fewer than six populations remaining), and occur primarily on public conservation lands. This, in turn, makes encounters with this species in Illinois very rare. However, several core areas occupied by the remaining Illinois populations are adjacent to private lands that are in agricultural use. Because of this, we believe it is important to remaining engaged with the Illinois Farm Bureau and potentially affected private landowners as stakeholders. We will also work closely to follow the lead of the Illinois Department of Natural Resources, which has a successful track record of working with private land owners (including farmers) in areas where eastern massasauga rattlesnakes occur to increase awareness of the conservation challenges faced by this species.

(30) Comment: FirstEnergy commented that the eastern massasauga rattlesnake is of interest to its 10 operating companies, as populations occur in their service area. They further commented that they use integrated vegetation management (IVM) to maintain grassland habitats within and along transmission corridors, thus providing ideal habitat for species like the eastern massasauga rattlesnake. They claimed that listing the eastern massasauga rattlesnake could have significant impacts on their operations in Pennsylvania and Ohio, from affecting new transmission line construction to routine transmission corridor maintenance, which could affect their ability to provide essential services to millions of people. They requested that, because maintenance and expansion of transmission corridors is beneficial to the conservation of the eastern massasauga rattlesnake (by managing succession), the Service consider a 4(d) rule specific to transmission corridors.

Our Response: While a number of populations of the eastern massasauga rattlesnake are considered to be extant in Pennsylvania and Ohio, many of those populations occur in scattered locations. While the limits of the species' range depicted on the map (see Figure 1, above) give the appearance that this species is widespread, many actions that would be expected to affect the species where it does occur may, in reality, take place in areas where it does not. In cases where proximity to a known location is uncertain, the commenter, or similar entities, can contact the Service's Ecological Services field offices for clarification and to address specific issues related to their needs. Also, in cases where an action is regulated or permitted by another Federal agency (for example the Federal Energy Regulatory Commission (FERC)), consultation

with the Service under section 7(a)(2) of the Act would also provide opportunities to determine best management practices in the event that the action may affect the species. There are other provisions of the Act that allow for the consideration of such management actions on a case-by-case basis; thus issuance of a species-specific 4(d) rule is not appropriate.

(31) Comment: A county government agency (Forest Preserve District of Will County, Illinois) stated that their land holdings include a now-extirpated population of eastern massasauga rattlesnake and provided supporting information. They also stated that they hoped listing would allow additional conservation efforts and possible reintroduction into previously occupied lands.

Our Response: We considered the best available data, including historical occurrences and the knowledge of local species experts, in conducting our SSA, and we also considered the population in Will County, Illinois, to be extirpated. We thank the commenter for providing additional information specific to surveys that led to this location being considered extirpated. We have incorporated that additional information into our revised SSA report. We will consider a range of recovery actions following listing and will work with local and State partners to determine and implement actions that would have the most benefit to the species.

(32) Comment: An individual reports having seen two eastern massasauga rattlesnakes in New Brunswick, Canada, but the commenter did not provide any documentation or supporting evidence.

Our Response: We considered the best available data, including historical occurrences and the knowledge of local species experts, in this listing determination. Because the eastern massasauga rattlesnake also occurs in Canada, we coordinated with colleagues from the responsible Federal (Parks Canada) and Provincial (Ontario Ministry of Resources and Forestry) governments in Canada in compiling records used in our SSA. We are aware of no documented records of the eastern massasauga rattlesnake in New Brunswick, and, as such, we do not consider this area to be part of the species' historical range. If, however, the species is documented from localities outside of the range as we currently understand it, we will update our records accordingly.

(33) Comment: One industry group urged the Service to endorse the integrated vegetation management (IVM) BMPs they implement, and expressed their strong belief that through close coordination between the Service and pipelines and utility companies utilizing IVM BMPs, they can help be part of the solution towards restoring populations of eastern massasauga rattlesnake.

Our Response: We thank the commenter for their suggestion and look forward to working collaboratively with landowners and managers from the public, private, and industry sectors following listing. Also, while the eastern massasauga rattlesnake has a broad geographic range, in many cases extant populations occur in widely scattered locations. Thus, instances where populations actually do occur close to certain project areas may actually be fairly limited. In cases where proximity to a known location is uncertain, the commenter, or similar entities, can contact the Service's Ecological Services field offices for clarification and to proactively address specific issues related to

their needs. Also, in cases where an action is authorized, funded, or carried out by another Federal agency (for example, FERC), consultation with the Service under section 7(a)(2) of the Act would also provide opportunities to determine best management practices in the event that the action may affect the species.

(34) Comment: One commenter stated that fire management is an important component of maintaining habitat for the eastern massasauga rattlesnake. They further commented that prairie species, like the eastern massasauga rattlesnake, are adapted to fire; thus, if fire is used appropriately, individuals can easily move to safety and very few will be killed.

Our Response: As stated in our response to Comment 1, above, we agree that the eastern massasauga rattlesnake is a species that occurs primarily within habitats that are dependent on periodic fires to maintain appropriate vegetative structure. Suppression of wildfires following European settlement has allowed degradation of many such plant communities through succession by woody vegetation, and land managers often use prescribed fire as a management technique to maintain these communities so that woody canopies are not established. However, because many of the remaining populations of the eastern massasauga rattlesnake are already small, and vulnerable to loss of individuals (Faust *et al.* 2011, pp. 59–60; Seigel and Shiel 1999, pp. 19–20), mortality resulting from prescribed fire was one of the most prominent stressors identified by Faust *et al.* (2011, pp. 12–16) and in the SSA. Please refer to our response to Comment 1, above, for more details regarding the use of prescribed fire.

(35) *Comment:* One commenter recommended that the Service not issue any rules that would impinge upon the private property rights of individual citizens on non-public lands. They further stated that there is no need to set aside specific lands or take private property to benefit this species, and that private landowners should only be required to participate on a voluntary basis.

Our Response: The Service works proactively with private landowners who want to voluntarily take measures to help conserve listed species on their property. We do not take private lands to benefit listed species. In cases where we acquire lands (for example, through fee-simple purchase, or through providing funding to our partners in State and local government, or to NGOs) to benefit listed species, it is the Service's policy that purchases be made from willing sellers, and that fair market price be paid. In cases where private landowners propose legal activities or uses of their lands that may lead to incidental take of listed species, the Act provides for mechanisms (such as habitat conservation plans) that allow interested parties to find collaborative ways to minimize and mitigate impacts to the species while still allowing them to proceed with their proposed activities. Similarly, if proposed land uses require actions (for example issuance of Federal permits) by other Federal agencies, section 7(a)(2) of the Act allows the action agency to consult with the Service to ensure that the action will not jeopardize listed species.

(36) *Comment:* One commenter specified that it is imperative to keep people safe on public lands. Thus, they recommended that the State natural resource agencies have the clear ability to remove snakes from areas where there is a high likelihood the snakes

will come into contact with people. Another commenter stated that the eastern massasauga rattlesnake poses a risk to livestock and pets in the summer months when the snakes are sunning themselves on roads, field edges, lawns, and rock piles. A third commenter added that listing the eastern massasauga rattlesnake will not protect it, as people who feel threatened by the snakes will continue to kill them and will not report it.

Our Response: The Act includes provisions to allow flexibility to remove individual snakes from situations where they present a risk to human health or safety. These provisions include the potential for both lethal and nonlethal take, and the situations in which these options are permissible are discussed above under our response to Comment 13. We also note that non-harmful actions to encourage eastern massasauga rattlesnakes to leave, stay off, or keep out of areas with frequent human use, including a residence, yard, structure, sidewalk, road, trail, foot path, or campground, would not result in take and thus are not prohibited. For example, maintenance of mowed lawn in areas of regular human use to discourage eastern massasauga rattlesnakes from entering these areas is acceptable.

(37) *Comment:* One commenter stated that *Sistrurus catenatus* populations east of the Mississippi are divided into two genetic units: a “western” unit consisting of individuals from populations in Illinois and Wisconsin and an “eastern” unit consisting of all other populations. The commenter stated that these populations are weakly phylogenetically distinct from each other and historical modeling suggests that eastern populations are derived from western populations through a post-glacial colonization process. The “western” unit is roughly comparable to the “western” unit proposed by

Ray *et al.* (2013, entire), while the “eastern” unit is consistent with the “central and eastern” units proposed by Ray *et al.* (2013, entire). The same commenter provided data based on genetic analysis of tissue samples from eastern massasauga rattlesnakes from northeast Iowa, indicating that snakes in the sampled population are genetically distinct from other eastern massasauga rattlesnake populations. Those data indicate that snakes in this population are of hybrid origin consisting of a mixture of approximately 80 percent genetic markers specific to the eastern massasauga rattlesnake and 20 percent genetic markers specific to the western massasauga rattlesnake (*Sistrurus tergeminus*). The commenter further stated that modeling indicates that they originated through a historical hybridization event between these species within the last 10,000 years, likely as a result of shifting species distributions due to post-glacial environmental effects. The commenter stated that the conservation status of these northeast Iowa populations should be assessed.

Our Response: We appreciate the information provided on the emerging science on genetics and taxonomy of eastern massasauga rattlesnakes. We hope to continue the close working relationship with the commenter as the science advances. The data on genetic haplotypes described by Ray *et al.* (2013, entire) have been peer-reviewed and published. Furthermore, these haplotypes are current recognized by the American Zoological Association in managing their captive populations. Thus, we used the genetic haplotypes of Ray *et al.* (2013, entire) to delineate our analysis units into a western analysis unit, a central analysis unit, and an eastern analysis unit. We understand that the commenter is also researching this topic and has stated intent to publish it in a peer-reviewed journal. The Act requires us to use the best available data in decision making,

and we hope to continue the close working relationship with the commenter as the genetic science on the species advances.

With regard to the detection of possible past hybridization in the Iowa population, we thank this commenter for providing new information. Since this comment was submitted, we have discussed this topic further with the commenter. Because the population in question is comprised primarily of genetic markers of the eastern massasauga rattlesnake, we still consider the northeast Iowa individuals to be eastern massasauga rattlesnakes.

(38) Comment: The Nature Conservancy's Indiana Office provided an overview of the status of eastern massasauga rattlesnake populations at sites they own in Indiana and that historically supported the species.

Our Response: We thank the commenter for providing additional information on the historical occurrence of the eastern massasauga rattlesnake on their land holdings, and we have added it to information gathered from the Natural Heritage Database as provided by the Indiana Department of Natural Resources so that it may augment our data on the species.

(39) Comment: One commenter stated that there is no evidence that the eastern massasauga rattlesnake existed in Missouri, and that populations in eastern Missouri should be considered as western massasauga rattlesnakes, a different species. The commenter stated that populations of the eastern massasauga rattlesnakes occurring east of the Mississippi River warrant protection.

Our Response: In evaluating the taxonomy and distribution of the eastern massasauga rattlesnake, we considered the best available scientific information (see pages 8–9 of the SSA report). While recent genetic studies showed that extant populations in central and northwestern Missouri belong to the western massasauga rattlesnake (*Sistrurus tergeminus*), no useful tissues from snakes in extreme eastern Missouri (St. Louis and Warren Counties) were available to the researchers for inclusion in the genetic studies because those populations are likely extirpated. This was confirmed during coordination between the Service and the responsible State fish and wildlife management agency (Missouri Department of Conservation). However, published studies on phenotypic variation (especially color pattern) of massasauga rattlesnakes from throughout Missouri—including the historical, but now likely extirpated populations in extreme eastern Missouri—indicate that the latter populations could be phenotypically included within the eastern massasauga rattlesnake. Recently extirpated, historical populations of the eastern massasauga rattlesnake were known from the adjacent part of Illinois, less than 19 miles (30 kilometers) from the historical eastern Missouri populations. In addition, genetic studies of massasauga rattlesnakes in Iowa indicate that the eastern massasauga genotype is present there (though these are also of likely past hybridization), well west of the Mississippi River. In the absence of better information on the taxonomic identity of the likely extirpated massasauga populations in extreme eastern Missouri, we have included those populations within the historical range of the eastern massasauga rattlesnake.

(40) Comment: One commenter stated that the eastern massasauga rattlesnake is more prevalent than MI DNR or the Service estimate and that the species is common in northern Michigan.

Our Response: It is widely recognized that Michigan still harbors a greater number of extant populations of the eastern massasauga rattlesnake than any of the other nine States and the one Canadian Province where the species occurred historically. We coordinated with our partner State fish and wildlife agencies, consulted the most current information from Natural Heritage Databases, and solicited information from species experts for each State and for Ontario to compile the most current data on the species. In addition to these scientific sources, we sought out public comment and data through the proposed listing rule's public comment period. In Michigan specifically, MNFI houses the Natural Heritage Database; they, among others, provided input on the Michigan populations. Based on these data, historically and currently, Michigan harbors a greater number of extant populations than any of the other nine States and Ontario. There are 259 known populations of eastern massasauga rattlesnake in Michigan; this is 46 percent of all known populations rangewide. Of these, 158 (61 percent) are believed to persist today and another 47 have unknown status; the Michigan populations represent 59 percent of all known extant populations rangewide. Thus, compared to other localities, the eastern massasauga rattlesnake was historically and continues to be more prevalent in Michigan than in any other State. We acknowledge that there may still be some undocumented populations remaining, especially in Michigan. We recommend that individuals with specific knowledge of populations contact MNFI to ensure the locations of eastern massasauga rattlesnake are known.

(41) Comment: Several commenters stated that the species should be listed as endangered rather than threatened, but did not provide further rationale or new evidence in support of this recommendation.

Our Response: For reasons discussed in the **Determination** section of this final rule, the Service has determined that the eastern massasauga rattlesnake meets the Act's definition of a threatened species, rather than an endangered species.

Determination

Section 4 of the Act (16 U.S.C. 1533), and its implementing regulations at 50 CFR part 424, set forth the procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(a)(1) of the Act, we may list a species based on: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. Listing actions may be warranted based on any of the above threat factors, singly or in combination.

We have carefully assessed the best scientific and commercial data available regarding the past, present, and predicted future condition of the eastern massasauga rattlesnake and how threats are affecting the species now and into the future. The species faces an array of threats that have and will likely continue (often increasingly) to contribute to declines at all levels (individual, population, and species). The loss of habitat was historically, and continues to be, the threat with greatest impact to the species

(Factor A), either through development or through changes in habitat structure due to vegetative succession. Disease, new or increasingly prevalent, is another emerging and potentially catastrophic threat to eastern massasauga rattlesnake populations (Factor C) that is likely to affect the species in the foreseeable future. As population sizes decrease, localized impacts, such as collection and persecution of individuals, also increases the risk of extinction (Factor B). These stressors are chronic and are expected to continue with a similar magnitude of impact into the future. Additionally, this species is vulnerable to the effects of climate change through increasing intensity of winter droughts and increasing risk of summer floods (Factor E), particularly in the southwestern part of its range (Pomera *et al.* undated, unpaginated; Pomera *et al.* 2014, pp. 95–97).

Some conservation actions (for example, management of invasive species and woody plant encroachment, timing prescribed fires to avoid the active season) are currently in place, and provide protection and enhancement to some eastern massasauga rattlesnake populations (see pp. 43–45 in the SSA report for a full discussion). However, our analysis projects that eastern massasauga rattlesnake populations will continue to decline even if current conservation measures are continued into the future. As a result of these factors, the number and health of eastern massasauga rattlesnake populations are anticipated to decline across the species' range, particularly in the southwestern portions of the range, where large losses relative to historical conditions have already occurred.

Further, the reductions in eastern massasauga rattlesnake population numbers, distribution, and health forecast in the SSA report likely represent an overly optimistic scenario for the species, and future outcomes may be worse than predicted. Because of

the type of information available to us, the quantitative analysis assumes that threat magnitude and pervasiveness remain constant into the future, but it is more likely that the magnitude of threats will increase into the future throughout the range of the species (for example, the frequency of drought and flooding events are likely to increase) or that novel threats (for example, new pathogens) may arise. In addition, some currently identified threats are not included in the quantitative analysis (for example, disease, road mortality, persecution/collection, and impacts from climate change), because we lack specific, quantitative information on how these factors may affect the species in the future. These factors and their potential effects on the eastern massasauga rattlesnake were discussed and considered qualitatively as part of the determination.

The species' viability is also affected by losses of populations from historical portions of its range, which may have represented unique genetic and ecological diversity. The species is extirpated from Minnesota and Missouri, and many populations have been lost in the western part of the species' range. Rangewide, the extent of occurrence is predicted to decline by 80 percent by year 50. Actual losses in extent of occurrence will likely be greater than estimated because of the methodology used in our analysis, as discussed above.

The Act defines an endangered species as any species that is "in danger of extinction throughout all or a significant portion of its range" and a threatened species as any species that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." A key statutory difference between an endangered species and a threatened species is the timing of when a species may be in danger of extinction, either now (endangered species) or in the foreseeable future

(threatened species). Based on the biology of the eastern massasauga rattlesnake and the degree of uncertainty of future predictions, we find that the “foreseeable future” for the species is best defined as 50 years. Forecasting to 50 years, the current threats are still reliably foreseeable at the end of that time span based on models, available information on threats impacting the species, and other analyses; however, we cannot reasonably predict future conditions for the species beyond 50 years. Our uncertainty in forecasting the status of the species beyond 50 years is also increased by our methodology of extrapolating from a subset of modeled populations to all extant or potentially extant populations.

We find that the eastern massasauga rattlesnake is likely to become endangered throughout its entire range within the foreseeable future based on the severity and pervasiveness of threats currently impacting the species, the projected loss of populations rangewide (loss of resiliency and redundancy), and the projected loss of its distribution within large portions of its range. This loss in distribution could represent a loss of genetic and ecological adaptive diversity, as well as a loss of populations from parts of the range that may provide future refugia in a changing climate. Furthermore, many of the currently extant populations are experiencing high magnitude threats. Although these high magnitude threats are not currently pervasive rangewide, they are likely to become pervasive in the foreseeable future as they expand and impact additional populations throughout the species’ range. Therefore, on the basis of the best available scientific and commercial data, we determine that the eastern massasauga rattlesnake is likely to become an endangered species within the foreseeable future throughout all of its range,

and, thus, we are listing it as a threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

We find that an endangered species status is not appropriate for the eastern massasauga rattlesnake. In assessing whether the species is in danger of extinction, we used the plain language understanding of this phrase as meaning “presently in danger of extinction.” We considered whether extinction is a plausible condition as the result of the established, present condition of the eastern massasauga rattlesnake. Based on the species’ present condition, we find that the species is not currently in danger of extinction. The timeframe for conditions that render the species to be in danger of extinction is beyond the present. While the magnitude of threats affecting populations is high, threats are not acting at all sites at a sufficient magnitude to result in the species presently being in danger of extinction. Additionally, some robust populations still exist, and we anticipate they will remain self-sustaining.

The SSA results likely represent an overly optimistic scenario for this species (see pp. 87–88 of the SSA report for a list of assumptions and their expected effect). For example, the analysis treated populations of unknown status as if they were all extant, likely resulting in an overestimate of species’ viability. Thus, we considered whether treating the populations with an “unknown” status as currently extant in the analysis had an effect on the status determination. We examined whether the number of self-sustaining populations would change significantly over time if we instead assumed that all populations with an “unknown” status were extirpated. The results are a more severe projected decline in the eastern massasauga rattlesnake’s status than our analysis projects

when we assign the unknown status populations to the “extant” category, but not to the extent that we would determine the species to be currently in danger of extinction.

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or is likely to become so throughout all or a significant portion of its range. Because we have determined that the eastern massasauga rattlesnake is likely to become in danger of extinction within the foreseeable future throughout all of its range, no portion of its range can be “significant” for purposes of the definitions of “endangered species” and “threatened species.” See the Final Policy on Interpretation of the Phrase “Significant Portion of Its Range” in the Endangered Species Act’s Definitions of “Endangered Species” and “Threatened Species” (79 FR 37578; July 1, 2014).

Critical Habitat

Background

Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features:

- (a) Essential to the conservation of the species, and
- (b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Our regulations at 50 CFR 424.02 define the geographical area occupied by the species as: An area that may generally be delineated around species’ occurrences, as

determined by the Secretary (i.e., range). Such areas may include those areas used throughout all or part of the species' life cycle, even if not used on a regular basis (for example, migratory corridors, seasonal habitats, and habitats used periodically, but not solely by vagrant individuals).

Conservation, as defined under section 3 of the Act, means to use, and the use of, all methods and procedures that are necessary to bring an endangered or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the requirement that Federal agencies ensure, in consultation with the Service, that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Critical habitat designation does not allow the government or public to access private lands, nor does it require implementation of restoration, recovery, or enhancement measures by non-Federal landowners. Where a landowner requests Federal agency funding or authorization for an action that may affect a listed species or critical habitat, the Federal agency would be required to consult with the Service under section 7(a)(2) of the Act, but even if consultation leads to a finding that the action would likely cause

destruction or adverse modification of critical habitat, the resulting obligation of the Federal action agency and the landowner is not to restore or recover the species, but rather to implement reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat.

Under the first prong of the Act's definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat designation if they contain physical or biological features (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific and commercial data available, those physical or biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat). In identifying those physical or biological features, we focus on the specific features that support the life-history needs of the species, including but not limited to, water characteristics, soil type, geological features, prey, vegetation, symbiotic species, or other features. A feature may be a single habitat characteristic, or a more complex combination of habitat characteristics. Features may include habitat characteristics that support ephemeral or dynamic habitat conditions. Features may also be expressed in terms relating to principles of conservation biology, such as patch size, distribution distances, and connectivity.

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed if we determine that such areas are essential for the conservation of the species. We will determine whether unoccupied areas are essential for the

conservation of the species by considering the life-history, status, and conservation needs of the species. This will be further informed by any generalized conservation strategy, criteria, or outline that may have been developed for the species to provide a substantive foundation for identifying which features and specific areas are essential to the conservation of the species and, as a result, the development of the critical habitat designation. For example, an area currently occupied by the species but that was not occupied at the time of listing may be essential to the conservation of the species and may be included in the critical habitat designation.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the Federal Register on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106-554; H.R. 5658)), and our associated Information Quality Guidelines, provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. For example, they require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

When we are determining which areas should be designated as critical habitat, our primary source of information is generally the information from the SSA and information developed during the listing process for the species. Additional information sources may include any generalized conservation strategy, criteria, or outline that may have been developed for the species, the recovery plan for the species, articles in peer-reviewed

journals, conservation plans developed by States and counties, scientific status surveys and studies, biological assessments, other unpublished materials, or experts' opinions or personal knowledge.

Habitat is dynamic, and species may move from one area to another over time. We recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be needed for recovery of the species. Areas that are important to the conservation of the species, both inside and outside the critical habitat designation, will continue to be subject to: (1) Conservation actions implemented under section 7(a)(1) of the Act, (2) regulatory protections afforded by the requirement in section 7(a)(2) of the Act for Federal agencies to ensure their actions are not likely to jeopardize the continued existence of any endangered or threatened species, and (3) section 9 of the Act's prohibitions on taking any individual of the species, including taking caused by actions that affect habitat. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. These protections and conservation tools will continue to contribute to recovery of this species. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning efforts if new information available at the time of these planning efforts calls for a different outcome.

Prudency Determination

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12), require that, to the maximum extent prudent and determinable, we designate critical habitat at the time the species is determined to be an endangered or threatened species. Our regulations (50 CFR 424.12(a)(1)) state that the designation of critical habitat is not prudent when one or both of the following situations exist:

(1) The species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of threat to the species, or

(2) Such designation of critical habitat would not be beneficial to the species.

In determining whether a designation would not be beneficial, the factors the Service may consider include but are not limited to: Whether the present or threatened destruction, modification, or curtailment of a species' habitat or range is not a threat to the species, or whether any areas meet the definition of "critical habitat." In our proposed listing rule, we determined that both of the above circumstances applied to the eastern massasauga rattlesnake. However, under our updated critical habitat regulations at 50 CFR 424.12 (81 FR 7414; February 11, 2016), we cannot conclude that critical habitat designation would not be beneficial to the species because we have found that there are threats to the species' habitat (the present or threatened destruction, modification, or curtailment of its habitat or range (Factor A) is a threat to the species). However, we still find that designation of critical habitat is not prudent under the first circumstance because we have determined that the eastern massasauga rattlesnake is threatened by taking or other human activity and that identification of critical habitat can be expected to increase the degree of threat to the species.

Overutilization in the form of poaching and unauthorized collection (Factor B) of the eastern massasauga rattlesnake for the pet trade is a factor contributing to declines, and remains a threat with significant impact to this species, which has high black market value. For example, an investigation into reptile trafficking reports documented 35 eastern massasauga rattlesnakes (representing nearly one entire wild source population) collected in Canada and smuggled into the United States, most destined for the pet trade (Thomas 2010, unpaginated). Snakes in general are known to be feared and persecuted by people, and venomous species even more so (Ohman and Mineka 2003, p. 7; Whitaker and Shine 2000, p. 121). As a venomous snake, the eastern massasauga rattlesnake is no exception, with examples of roundups or bounties for them persisting through the mid-1900s (Bushey 1985, p. 10; Vogt 1981; Wheeling, IL, Historical Society website accessed 2015), and more recent examples of persecution in Pennsylvania (Jellen 2005, p. 11) and Michigan (Baily *et al.* 2011, p. 171). The process of designating critical habitat would increase human threats to the eastern massasauga rattlesnake by increasing the vulnerability of this species to unauthorized collection and trade, or to persecution, through public disclosure of its locations. Designation of critical habitat requires the publication of maps and a specific narrative description of critical habitat in the **Federal Register**. The degree of detail in those maps and boundary descriptions is far greater than the general location descriptions provided in this final rule to list the species as a threatened species. Furthermore, a critical habitat designation normally results in the news media publishing articles in local newspapers and special interest websites, usually with maps of the critical habitat. We have determined that the publication of maps and descriptions outlining the locations of this species would further facilitate unauthorized

collection and trade, as collectors would know the exact locations where eastern massasauga rattlesnakes occur. While eastern massasauga rattlesnakes are cryptic in coloration, they can still be collected in high numbers during certain parts of their active seasons (for example, spring egress from hibernation or summer gestation). Also, individuals of this species are often slow-moving and have small home ranges. Therefore, publishing specific location information would provide a high level of assurance that any person going to a specific location would be able to successfully locate and collect specimens, given the species' site fidelity and ease of capture once located. Due to the threat of unauthorized collection and trade, a number of biologists working for State and local conservation agencies that manage populations of eastern massasauga rattlesnakes have expressed to the Service serious concerns with publishing maps and boundary descriptions of occupied habitat areas that could be associated with critical habitat designation (Redmer 2015, pers. comm.). Designating critical habitat could negate the efforts of State and local conservation agencies to restrict access to location information that could significantly affect future efforts to control the threat of unauthorized collection and trade and persecution of eastern massasauga rattlesnakes.

Summary of Prudency Determination

We have determined that designating critical habitat for the eastern massasauga rattlesnake is not prudent. Designation of critical habitat would increase the threats to the eastern massasauga rattlesnake from persecution and unauthorized collection and trade. A limited number of U.S. species listed under the Act have commercial value in trade. The eastern massasauga rattlesnake is one of them. Due to the market demand and willingness of individuals to collect eastern massasauga rattlesnakes without

authorization, and the willingness of others to kill them out of fear or wanton dislike, we have determined that any action that publicly discloses the location of eastern massasauga rattlesnakes (such as critical habitat) puts the species in further peril. Many populations of the eastern massasauga rattlesnake are small, and the life history of the species makes it vulnerable to additive loss of individuals (for example, loss of reproductive adults in numbers that would exceed those caused by predation and other non-catastrophic natural factors), requiring a focused and comprehensive approach to reducing threats. One of the basic measures to protect eastern massasauga rattlesnakes from unauthorized collection and trade is restricting access to information pertaining to the location of the species' populations. Publishing maps and narrative descriptions of eastern massasauga rattlesnake critical habitat would significantly affect our ability to reduce the threat of persecution, as well as unauthorized collection and trade. We have, therefore, determined in accordance with 50 CFR 424.12(a)(1) that it is not prudent to designate critical habitat for the eastern massasauga rattlesnake.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened species under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. The recognition of a species, through listing, results in public awareness, and conservation by Federal, State, Tribal, and local agencies; private organizations; and individuals. The Act encourages cooperation with the States and other countries and requires that recovery actions be carried out for all listed species. The protection required by Federal agencies and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. Subsection 4(f) of the Act calls for the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery planning process involves the identification of actions that are necessary to address the threats to its survival and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning includes the development of a draft and final recovery plan. The recovery plan also identifies recovery criteria for review of when a species may be ready for downlisting or delisting, and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. When completed, the draft recovery plan and the final recovery plan will be available on our website (<http://www.fws.gov/endangered>), or from our Chicago Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**). Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (for example, restoration of native vegetation) and management, research, captive propagation and reintroduction, and

outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

Following publication of this final rule, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the States of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, and Wisconsin will be eligible for Federal funds to implement management actions that promote the protection or recovery of the eastern massasauga rattlesnake. Information on our grant programs that are available to aid species recovery can be found at:

<http://www.fws.gov/grants>.

Please let us know if you are interested in participating in recovery efforts for the eastern massasauga rattlesnake. Additionally, we invite you to submit any new information on this species whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is listed as an endangered or threatened species and with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund,

or carry out are not likely to jeopardize the continued existence of any endangered or threatened species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service.

Federal agency actions within the species' habitat that may require conference or consultation or both as described in the preceding paragraph include management and any other landscape-altering activities on Federal lands administered by the Service (Upper Mississippi National Wildlife and Fish Refuge, Wisconsin), U.S. Forest Service (Huron-Manistee National Forest, Michigan), National Park Service (Indiana Dunes National Lakeshore, Indiana), or military lands administered by branches of the Department of Defense (Fort Grayling, Michigan); flood control projects (Lake Carlyle, Illinois) and issuance of section 404 Clean Water Act (33 U.S.C. 1251 *et seq.*) permits by the U.S. Army Corps of Engineers; construction and maintenance of roads or highways by the Federal Highway Administration; and construction and maintenance of pipelines or rights-of-way for transmission of electricity, and other energy related projects permitted or administered by the Federal Energy Regulatory Commission.

Under section 4(d) of the Act, the Service has discretion to issue regulations that we find necessary and advisable to provide for the conservation of threatened species. The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to threatened wildlife. The prohibitions of section 9(a)(1) of the Act, as applied to threatened wildlife and codified at 50 CFR 17.31, make it illegal for any person subject to the jurisdiction of the United States to take (including harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these)

threatened wildlife within the United States or on the high seas. In addition, it is unlawful to import; export; deliver, receive, carry, transport, or ship in interstate or foreign commerce in the course of commercial activity; or sell or offer for sale in interstate or foreign commerce any listed species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to employees of the Service, the National Marine Fisheries Service, other Federal land management agencies, and State conservation agencies.

We may issue permits to carry out otherwise prohibited activities involving threatened wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.32. With regard to threatened wildlife, a permit may be issued for the following purposes: for scientific purposes, to enhance the propagation or survival of the species, for economic hardship, for zoological exhibition, for educational purposes, and for incidental take in connection with otherwise lawful activities. There are also certain statutory exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

It is our policy, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a final listing on proposed and ongoing activities within the range of the listed species. Based on the best available information, the following activities may potentially result in a violation of section 9 of the Act; this list is not comprehensive:

(1) Development of land or the conversion of native land to agricultural land, including the construction of any related infrastructure (for example, roads, bridges, railroads, pipelines, utilities) in occupied eastern massasauga rattlesnake habitat;

(2) Certain dam construction: in an area where the dam alters the habitat from native land types (for example, grassland, swamp, fen, bog, wet prairie, sedge meadow, marshland, peatland, floodplain forest, coniferous forest) causing changes in hydrology at hibernacula or where the dam causes fragmentation that separates snakes from hibernacula or gestational sites;

(3) Post-emergent prescribed fire: prescribed burns to control vegetation that are conducted after snakes have emerged from their hibernacula and are thus exposed to the fire;

(4) Post-emergent mowing for habitat management: mowing of vegetation after snakes have emerged from hibernacula can cause direct mortality by contact with blades or being run over by tires on mower;

(5) Water level manipulation: flooding or hydrologic drawdown affecting eastern massasauga rattlesnake individuals or habitat, particularly hibernacula;

(6) Certain research activities: collection and handling of eastern massasauga rattlesnake individuals for research that may result in displacement or death of the individuals; and

(7) Poaching, collecting, or persecuting individuals.

Based on the best available information, the following actions are unlikely to result in a violation of section 9 of the Act, if these activities are carried out in accordance with existing regulations and permit requirements; this list is not comprehensive:

(1) Pre-emergent fire: prescribed burns to control vegetation occurring prior to eastern massasauga rattlesnake emergence from hibernacula (typically in late March to early April); and

(2) Pre-emergent mowing or other mechanical vegetation removal: mowing or cutting of vegetation prior to eastern massasauga rattlesnake emergence from hibernacula.

Questions regarding whether specific activities would constitute a violation of section 9 of the Act should be directed to the Chicago Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Required Determinations

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*), need not be prepared in connection with listing a species as an endangered or threatened species under the Endangered Species Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

References Cited

A complete list of references cited in this rulemaking is available on the Internet at <http://www.regulations.gov> and upon request from the Chicago Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this final rule are staff members of the Midwest Regional Office.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Regulation Promulgation

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245, unless otherwise noted.

2. Amend § 17.11(h) by adding an entry for “Rattlesnake, eastern massasauga” to the List of Endangered and Threatened Wildlife in alphabetical order under REPTILES to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
* * * * *				
REPTILES				
* * * * *				
Rattlesnake, eastern massasauga	<i>Sistrurus catenatus</i>	Wherever found	T	[Insert Federal Register citation]; [Insert date of publication in the Federal Register]
* * * * *				

Dated: September 21, 2016.

Stephen Guertin,

Acting Director, U.S. Fish and Wildlife Service.

Billing Code 4333–15

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